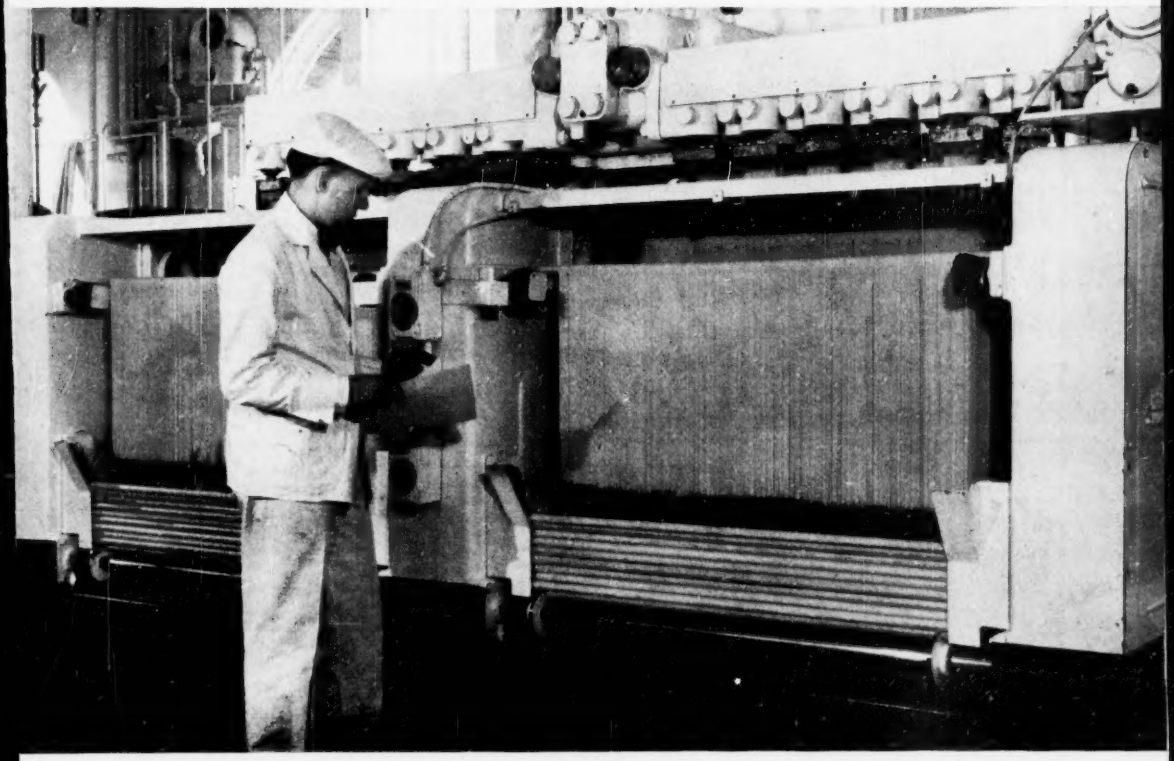
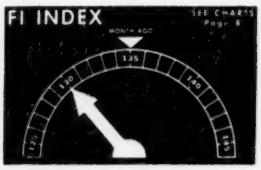
NATIONAL EDITION

Food Industries

For those who control quality and costs through management and production — a McGraw-Hill publication

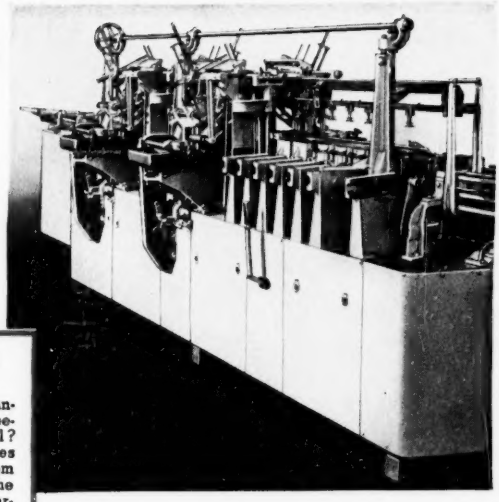


Spaghetti is extruded, cut, and draped on rods for drying — 1,000 lb. an hour — in Heinz' big press and spreader unit.



NOVEMBER, 1950: Save on your taxes, Food's 40-yr. rise, Handling halved, Engineering for big demand, Chemicals vs. foods, New color gage

DOES YOUR LABELING MEASURE UP TO *World* STANDARDS?



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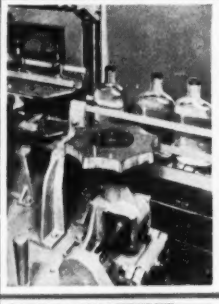
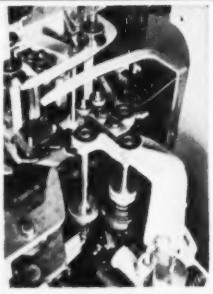


ACCURATE FEEDING OF CONTAINERS

Do you have the advantage of **Bee-Line's** free-wheeling Starwheel? Automatically spaces containers, feeds them correctly through the machine. If container arrives out-of-position, Starwheel stops to free the container, puts it back into proper timing, then restores normal, correctly-synchronized feed.

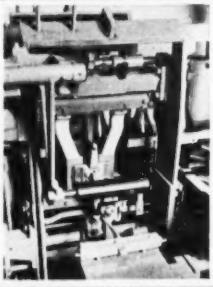
check YES | NO



ACCURATE POSITIONING OF CONTAINERS

Do your conditions require **Bee-Line's** Spotting Device? If so, this ingenious mechanical and hydraulic device is available to spin the container, then stop its rotation, then bring it gently on dead center and assure positive alignment for accurate label placement at a predetermined location on the container's circumference.

check YES | NO



ACCURATE LABEL REGISTRATION

Do you have the advantage of **Bee-Line's** Vacuum Gripfinger? Close-up shows Vacuum Gripfinger contacting the pickers. Pickers are opening for spreading of adhesive evenly over the entire label surface. Vacuum holds labels securely in position for controlled precision-register on the container.

Each of these advanced design-features can have a marked effect on the efficiency and economy of your labeling operations. Each is experience-engineered exclusively for WORLD **Bee-Line** Labelers

. . . to give you profitable, superbly neat, precision-labeling—applying body, neck and shoulder labels, and down to postage stamp size, on a variety of container shapes and sizes

. . . to give you continuous, safe, steady, dependable handling, without detours, collisions, traffic jams or delays. There's a **Bee-Line** for your needs: Model 65 for production up to 65 per minute; Model 135 for production up to 2 a second. Bulletin contains details and floor plans, write for your copy.

WORLD BEE-LINE LABELERS

"YOU GET THE BEST LABELERS IN THE WORLD"

ECONOMIC MACHINERY COMPANY

WORCESTER, MASSACHUSETTS

DIVISION OF GEO. J. MEYER MANUFACTURING CO.

BOX 453, MILWAUKEE, WISCONSIN

New York Philadelphia Pittsburgh Chicago San Francisco Los Angeles Denver Louisville Salt Lake City El Paso Seattle Portland Phoenix London Montreal Toronto Winnipeg Newfoundland Vancouver Mexico City Sydney, Australia Wellington, N.Z. San Juan, P.R. Ciudad Trujillo, D.R. Honolulu, T.H.

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FREE READER SERVICE . . .

HOW TO USE POSTCARD

Circle numbers of items you want to know more about; fill in your name and address; drop in mail (no postage required). We will tell companies what you are interested in and they reply direct to you.

TO MAKE IT HANDY

Products and literature in this issue are listed on these pages. There are three indexes: (1) editorial items on new equipment, new supplies, new literature; (2) products advertised; (3) advertisers.

WHAT THE NUMBERS MEAN

Advertisements: There is a page number on the postcard for each advertisement. Before the number may appear, L, R, T, B (left, right, top, bottom) locating the ad on the page; small letters following (a, b, c) indicate additional products in the advertisement.

Editorial Items: There is a page number on the postcard for each editorial item; ABC's distinguish the specific items on the page.

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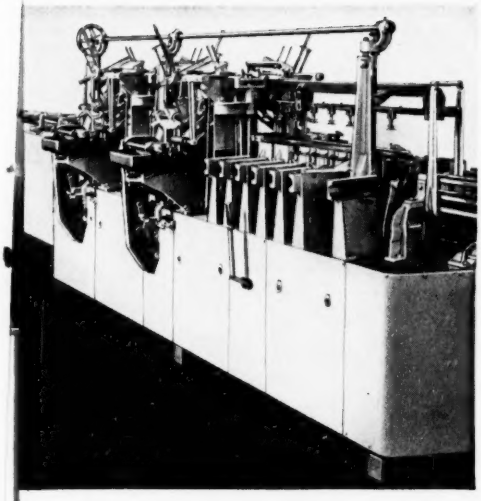

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WORLD

BEE-LINE LABELERS

IC MACHINERY COMPANY
WORCESTER, MASSACHUSETTS
F GEO. J. MEYER MANUFACTURING CO.
BOX 432, MILWAUKEE, WISCONSIN
Pittsburgh Chicago San Francisco Los Angeles Denver
City El Paso Seattle Portland Phoenix London Montreal
Newfoundland Vancouver Mexico City Sydney, Australia
San Juan, P.R. Ciudad Trujillo, D.R. Honolulu, T. H.

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Food Industries

NOVEMBER, 1950 • VOL. 22, NO. 11

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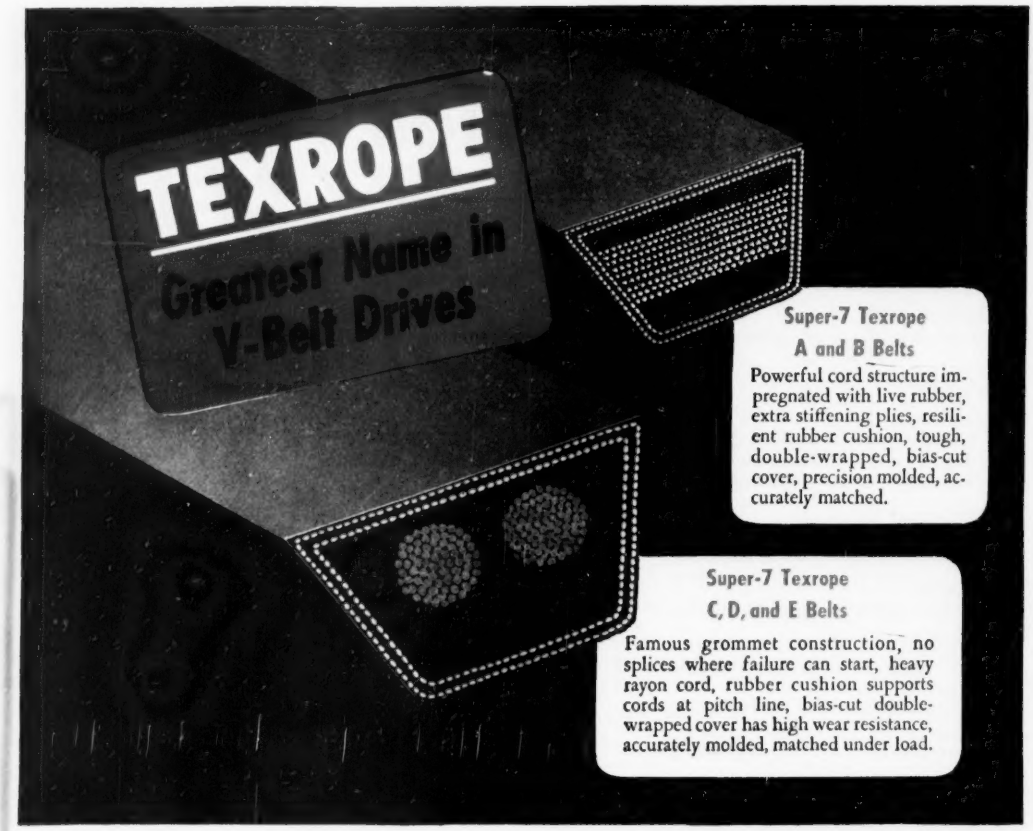

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A and B Belts

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Super-7 Texrope
C, D, and E Belts

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ALLIS-CHALMERS

HIGHLIGHTS

Antioxidant activity was found in 32 spices tested in fats at Hormel Institute, U. of Minnesota. And a few of these spices exhibited quite pronounced antioxidant properties, according to a preliminary report. (News)

New evaporator using heat pump principle, and of simplified, lower cost design, has been installed at Minute Maid plant. It is more efficient than the old thermo-compression units. Also, concentrate is frozen in 18 minutes in a converted walking-beam continuous beer pasteurizer, which sprays cold alcohol on cans. Advanced sanitation and quality control practices are thrown in for good measure. (Pg. 64)

Errors in pH determinations at upper and lower ends of a standard scale have been greatly reduced through development of four standard solutions by Bureau of Standards' chemists. Solutions extend from a low of 2.1 to a high of 11.7. Previous standards were accurate only between pH4 and 7. (New Technology)

High speed machine and low cost package has brought back the 5-cent pie. Machine forms tray and wraps the pies at a 90-a-min. clip. (Pg. 56)

Internal bruises in hams can be spotted by examining lymph gland. If it's blood red the ham is bruised internally. The gland is found at the interior junction of the ham and the loin . (Pg. 46)

Foods sterilized by a bombardment of 800,000-volt electrons have been preserved as long as a year without refrigeration at General Electric. But changes in color, taste and odor, as well as deactivation of digestion-aiding enzymes, leave the foods rather worse for wear.

Color difference meter furnishes canning industry with quick, readily reproducible method of measuring color of tomato products. Specifies color directly in three units, representing lightness, redness and yellowness. By substituting these values in an equation, color for U. S. grading can easily be obtained. (Pg. 70)

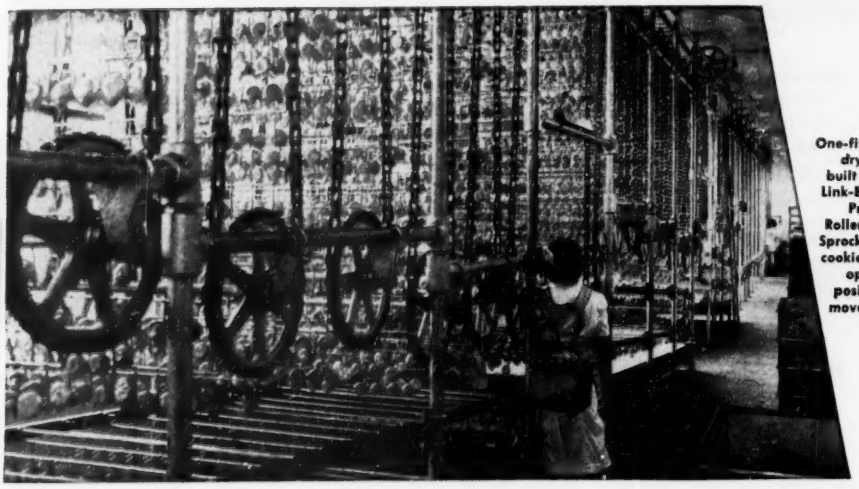
Interest in dehydrated fruits and vegetables, reestablished along with intensified defense activity, points up the almost total neglect of technical research since end of World War II. QM is going slow on orders because of low acceptance of most products. But it strongly urges resumption of engineering and processing studies. (News)

Hard candy is being cooled continuously, prior to machine-pulling and forming, in a unit developed at Thos. D. Richardson Co. Candy is fed onto a long stainless steel conveyor from a continuous cooker at the rate of 4,000 lb. per hour Also developed: A high-speed net weight bag filling machine that eliminates check-weighing before sealing. (Pg. 58)

Bottles of milk are automatically taken from the capper conveyor line and placed in cases by a new machine. Developed by Walker-Wallace, Ltd., it got lots of attention at the recent Dairy Industries Exposition.

Made-to-order Conveyors

from standard replaceable parts



One-fifth mile long dryer conveyor, built entirely with Link-Belt standard Precision Steel Roller Chains and Sprockets, handles cookies after icing operation. The positive, smooth movement results in minimum breakage.

It is likely that the right combination of Link-Belt Roller Chain and attachments will meet your exact conveying needs. In this way, conveyors can be made-to-order to lift, carry, move or push anything you want, along the path you wish.

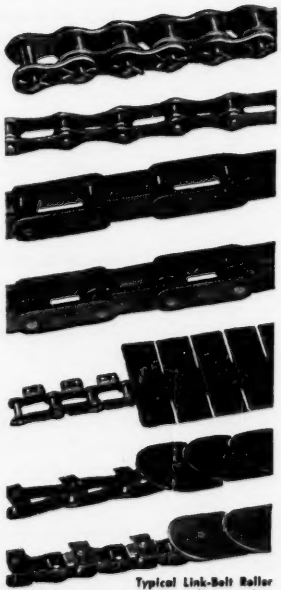
Link-Belt Engineers have devised many ingenious systems from standard parts. This has the advantage of modest initial cost plus easy and available replacement parts. A discussion of your conveying needs with a Link-Belt Engineer may result in a quick, easy way to reduce handling costs.

LINK-BELT
PRECISION STEEL
ROLLER CHAINS
AND SPROCKETS

THE SYMBOL OF QUALITY — LB — LINK-BELT

LINK-BELT COMPANY 12,179

Chicago 9, Indianapolis 6, Philadelphia 40, Atlanta, Houston 1, Minneapolis 5, San Francisco 24, Los Angeles 33, Seattle 4, Toronto 8, Johannesburg. Offices, Factory Branch Stores and Distributors in Principal Cities.



Typical Link-Belt Roller Chains for Conveying and Power Transmission

The Talk of the Industry

It's Not How Much, But What

War's impact on the confectionery industry is misleading if gaged by volume of military requirements. QMC at the end of September had purchased or requested bids for some 7 million pounds of candy. Which is not much compared to the 2.6 billion pounds purchased in 1949.

But that is not the whole story. QMC wants more kinds of candy to add to rations, including additional types of bars, disks and bite-size pieces. In other words, the problem lies in types, shapes and packages, not in quantity. Industry research is being focused on the problem, and all confectionery manufacturers are urged to cooperate.

As with most processed foods, raw materials and production capacity are quite adequate.

Will Stockpile Abundance—In Case

Department of Agriculture effort again is leaning toward encouragement of agricultural production, in some cases especially for the food industries. This is a striking shift from the recent policy of production control and curtailment. The cause is, of course, the international situation. Better to have plenty—in case.

As yet no food is so scarce as to require administrative attention by the new National Production Authority. All inventory limits set in NPA regulation No. 1 pertain to non-foods. So you need not worry about those rules—for the present, that is.

Freeze Grinding Developed

Difficult-to-grind materials are finely pulverized at rates as high as 700 lb. per hour in a 5-hp hammer mill by a new Linde method. The trick is to rapidly cool the product to the point of fragility by application of liquid nitrogen, cooling being done in a special heat exchanger between the feed hopper and the mill.

At present, the method is limited to moderate- and high-cost materials, but it is suggested for such foods as spices, coffee, cocoa, gelatin, and agar-agar.

Certainly a heat-sensitive product would not be damaged by comminution at −320 deg. F.

Another Juicy Food Boom

Another new processed food product has skyrocketed to success. Although on the market only about a year, frozen lemonade concentrate was topped only by frozen concentrated orange juice in volume of sales for frozen fruits and juices this past summer. Something like 2 million gallons of the product was packed in the first year, and the experts predict three to five times that volume next year.

While the big demand for the ready-squeezed lemonade concentrate obviously comes during the hot months, it is not just a summer item. It is catching on as a handy highball ingredient, and bakers and housewives are trying it in lemon-flavored foods.

The product is almost certain to pull the lemon growing industry out of the doldrums. And it demonstrates again the importance of advanced food processing to the farmer and distributor ends of the Life Line of America—not to mention its value to the public.

Fluid-Metal Tests Bread

Another contribution has been made to quick simplicity in measuring a food quality. George F. Garnatz, director of Kroger Food Foundation, has come up with an ingenious gadget to determine bread freshness.

A slice of bread is placed under a disk to which is attached a vertical shaft that supports a flask. Mercury is flowed into this flask until its weight produces standard compression of the slice. At this point an electric signal tells the operator to close the mercury valve. Then the weight of mercury in the flask is a measure of the bread's freshness.

This flowing-mercury idea might be applied to other compression food testers. And if you want to get really fancy, an automatic mercury cut-off could be engineered into it.

Chipper Business—Up 500 Percent

Potato chip manufacturers now use about 8 percent of all potatoes consumed for food in the United States. This represents an increase of five-fold in 10 years. And it takes a nice chip off the spud surplus.

Hors d'Oeuvres

■ On September 15, Blatz offered eleven carloads of canned beer free to the armed forces in Korea. On the same day the UN invaded Inchon and the rout was on. Let's not split hairs here by asking too many questions.

■ National Association of Popcorn Mfrs. reports a USDA circular as saying that their product has more food energy units than all cooked fish and meats (except very fat meats), all vegetable and fruits, all breads and cakes, all varieties of cheese (except Swiss), and all table beverages. Why are we fooling around with these nonessential foods, anyway?

■ Now USDA claims you can get a friable meal from waste feathers at an estimated cost of $34 per ton and can then sell it for $60 as a component for mixed fertilizers. Moreover, the feathers are poultry, not horse.

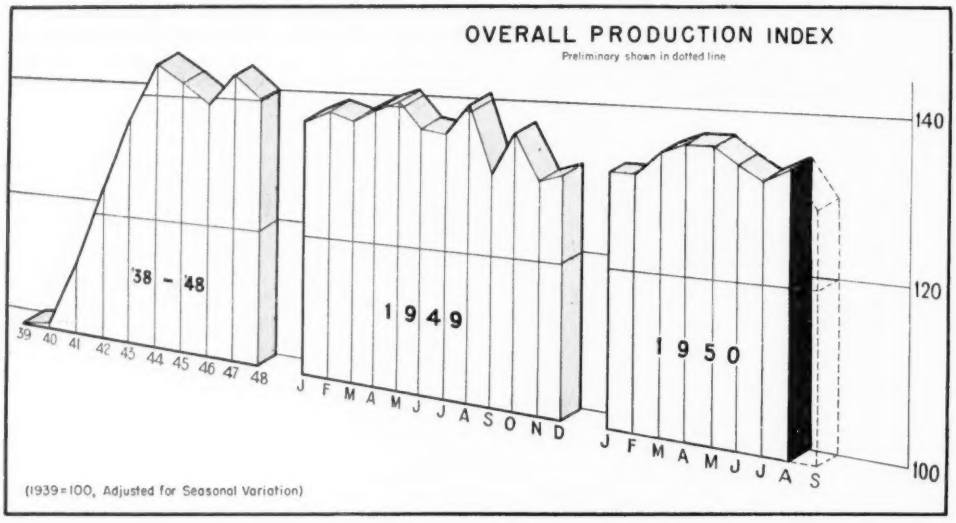
■ Survey of equal portions of New York's Democratic and Republican women revealed that 75 percent of the former and 76 percent of the latter voted to repeal the state's margarine restricting laws. Women just can't seem to understand you gotta have an issue.

■ A magistrate in England says that after it's sliced it's no longer a loaf of bread, so isn't subject to minimum weight regulations. Seems to be the sort of a man the U. S. food industry could put to use.

■ Contending that all canners get the same use of their plants, a Los Angeles sardine packer claimed he was entitled to a 50 percent reduction on plant and equipment assessments, to conform to the assessments on a small neighboring canner. Board of Supervisors didn't take to the idea. Some West Coasters blame dizzy spells on their speculation of what would have resulted had the B of S said "O. K."

JAJJ.

FI Index and Outlook


OVERALL PRODUCTION INDEX
Preliminary shown in dotted line
140
120
100
38 - 48
39 40 41 42 43 44 45 46 47 48
1949
J F M A M J J A S O N D
1950
J F M A M J J A S
(1939=100, Adjusted for Seasonal Variation)

Decline in Processed Food Output Not Expected to Continue

With all economic signs pointing to increases in demand, crop yields will be only limiting factor

ACTIVITY in processing fell off again, in September, to a postwar low of 130 (preliminary) on our index. This followed a revised August figure of 135. Operations continued below earlier expectations in the important canning field.

Final reports on the size of 1950 crops help explain the decline in processing from 1949. Total farm production is close to last year's. But some of the best crops have been feed grains. Other items, which go into manufactured food products, have not been available in such large quantities.

The shortest crop has been fruit for processing. Peach production particularly is down a third. Pears are off a sixth. There are also less grapes, cherries and apples. This situation is expected to reverse in coming months as the citrus season begins. Current estimates place production of oranges 2 percent above last year and grapefruit 40 percent higher.

Florida has the best outlook of the citrus regions. A 100,000,000-box citrus crop is foreseen there. Texas conditions are much better than last year, but production is not expected to regain levels reached before the 1949 freeze. California and Arizona prospects are fair.

Meanwhile processed food output continues to run ahead of last year in those fields where adequate raw material supplies are available. This is true of meat, sugar and milk products. Most of the increased milk flow is reflected in higher butter production than in 1949.

In the months ahead, most of the food industry will be processing and shipping to distributors the crops from the season just ended. The size of inventories and consumer demand will be dominant factors in the outlook, whereas crop prospects have been all important in the last few months.

All signs point to continued high consumer demand. Scarce buying may be over, but workers throughout the country are receiving wage increases. And this higher income will mean steady improvement in family diets. Meat consumption, for example, is expected to climb back to the wartime peak, on a per capita basis. Dairy products also should gain. With prices of milk and butter held near government supported levels by the large milk flow, sales of cheese and ice cream can benefit from freer consumer spending.

The industry may also be helped by restrictions on the sale of consumer durable goods. Tight credit regulations will make it harder for people to spend an abnormal percentage of their incomes on such things as automobiles and television sets. And manufacturers probably will not have

At a Glance—

(1939 = 100, with all figures adjusted for seasonal variation.)

	Aug. 1950	July 1950	Percent Change	Year Ago
Baking	131	125	+5	126
Butter	74	75	−1	76
Canning	156	155	+1	176
Cheese	163	163	0	165
Confectionery	144	132	+9	133
Evap. Milk	137	123	+11	151
Flour	106	112	−5	100
Ice Cream	175	164	+7	189
Malt Liquors	167	176	−5	170
Margarine	367	480	−24	345
Meat Products	150	148	+1	145
Sugar	108	108	0	83

Margarine July and August figures represent a revision as well as sharp contra-seasonal increases in production.

enough steel to make so many durable items available as in 1950.

The last time this happened—during World War II—people spent more money on food. And this is very likely to happen again. Paychecks will be higher. And if installment payments for durables are less, housewives can spend more at the grocery counter.

Of course the physical quantity of food purchased will be limited by available supplies. In many cases prices will undoubtedly rise. In nearly all cases, inventories now held by processors should move quickly to distributors, and across the counter to the public.

This provides every incentive for increasing output where possible. Both the armed forces and civilian distributors are expected to make continued heavy demands on processors. With this in mind, the Department of Agriculture has already announced a policy of encouraging big increases in farm production generally for next year.

Some food men naturally have questions about this coming increase in demand. When is it coming? And for which product? The FI overall production index is still relatively low. And so are some of the components.

Here are some points worth remembering:

1. The really big increase in demand for food still hasn't hit. The defense program is only getting started. The increased payrolls it brings are only beginning to mount. Meanwhile, people are still spending heavily for consumer durables. And they are paying higher withholding taxes. The switch to heavier spending on food may be some months away. But when it comes, it may top World War II proportions. Inflation has a faster start this time because consumer income has been high all along.

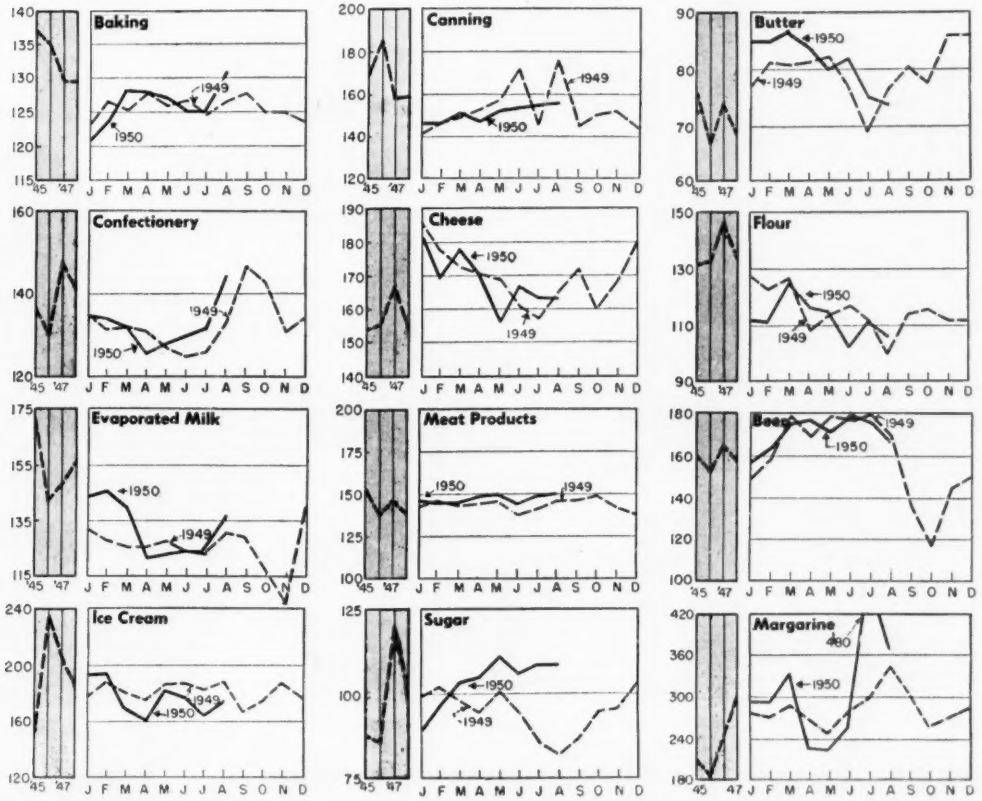
2. Rising demand for food generally doesn't guarantee rising demand for any particular product. Few industries have so many competing items. Eating habits, changed in World War II, will probably change further in another superboom.

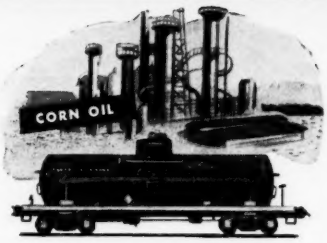
Exports can drop, too. Most foreign countries had good crops this year. So it will be harder to sell basic foods like flour abroad. But foreigners also have more dollar exchange to buy luxury products.

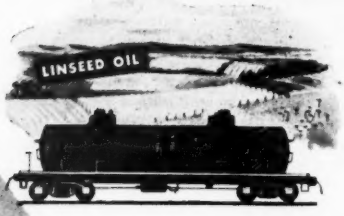
3. Some food lines have sharp fluctuations from month to month. Price changes and inventory policies have this short term effect on production. So do seasonal factors, depending on crops. But the long term may still be up, even though output for the month shows—at first glance—an alarming drop.

These comments definitely apply to our graph (opposite page) showing overall food production. Even though output now stands at 130, the 140 level reached in 1949 is still very much in sight. In 1949 crops were good, but demand wavered. In 1950 crops have not come up to demand. During World War II, strong demand plus good crops pushed the index above 140. It could happen again.

RISING ▲ STEADY ➤ FALLING ▼







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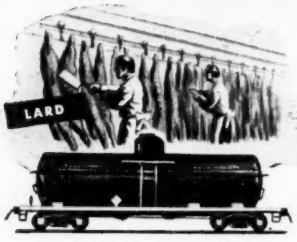
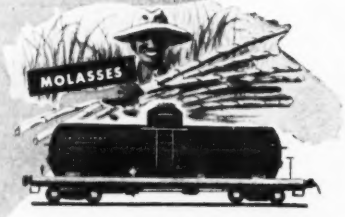
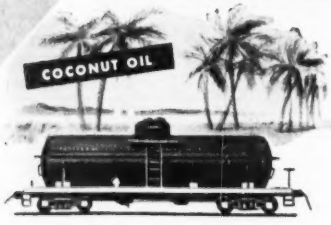
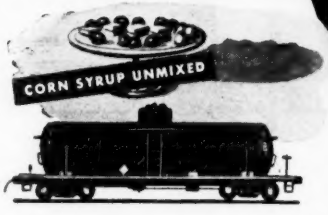
Tank cars









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What Washington Thinks

TOO FEW CARS—Already stepped-up defense problems are taking freight cars for military service in large numbers. Food companies must expect a shortage. Prompt unloading and loading of cars after they are placed is essential. ICC rules increasing demurrage charges will make it profitable to be prompt. Few can afford even $5 a day, much less the $10 or $20 imposed for long-time holding.

BOOSTING THE "POTENTIAL"—Department of Agriculture is making an effort to determine the potentials for production of all important agricultural commodities. The talk is of increased output and readiness for new output that may be necessary on short notice. Pre-election emphasis on this subject has looked a bit more political than economic. But underlying the whole move is a sound desire to be sure that any sudden new crop need can be met as quickly as possible in view of the time required to plant and reap. Comparable effort can be expected in animal crop problems, with the initial effort being made on poultry, meat, and dairy sources.

MILK FOR BETTER BREAD—Bureau of Dairy Industry investigations indicate that present commercial usage of milk solids in normal white bread amounts to only about 1.5 percent. From the research results obtained, the Bureau staff concludes that "a much more nutritious loaf of bread could be made by doubling the average amount of milk solids." Other advantages claimed are larger loaf of better texture, more attractive appearance, better toasting and keeping quality, greater volume yield per unit of flour, better crust color, and superior flavor. Study indicates also the best methods of preparation of milk or milk products in order to secure maximum benefit in these properties.

INVENTORY CONTROL—The first order issued by the new National Production Authority was intended to regulate the industrial inventories of key materials that showed up scarce during the Korean emergency. Fortunately for food executives, NPA Regulation No. 1 as yet includes no food commodities, either raw material or product. But anyone anticipating scarcity of some special commodity might well study the rules, which are probably an excellent forecast of the way in which such food shortages will later be handled as they develop.

SCIENCE FOUNDATION—Congress first decided that National Science Foundation was not likely to contribute immediately to the military effort. (No one knows who originated that idea, which seems fully disproved by even a casual review of World War II experience.) Later it was decided to let the Foundation make a small start with an organization fund of $225,000. President Truman is likely to use that action as a go-ahead signal and proceed with nomination of the members of the Foundation board. These nominations should go to the Senate after it convenes on November 27, or certainly early in the new Congress which meets in January.

DRAFT OF SCIENTISTS—There has been talk about having chemists, physicists, and other scientists, treated as a group, the way medical men are treated under a special modification of the draft law controlling doctors, dentists, and related scientific workers. That is not likely. Similar efforts in World War II failed. General Hershey, whose philosophy largely governs all military personnel questions, seems unalterably opposed. That probably spells defeat for the idea, regardless of who may sponsor it. Scientists themselves had better look at the doctor-draft bill before they ask for a comparable measure. Actually it is more restrictive up to the age of 50 than it is a protection for the medics.

PRODUCTION EFFICIENCY—A critical study has been made of the canning and preserving industry by Bureau of Labor Statistics to determine the trend of "Productivity in the Canning and Preserving Industry Group." A study of man-hours per unit of manufacture covers 1939 to 1949 inclusive. Amazing improvements in output per man-hour during the decade are indicated. Many outside of this division of food manufacture may profit by getting from the Bureau the little mimeographed statement titled, *Productivity in the Canning and Preserving Industries Group: 1939–49.* It gives an interesting interpretation of the basic index which one should use in studying the technologic processes in any food business.

FEED RATIOS—Formerly, a forecast of an abundant hay and feed-grain supply meant better finished animals at lower cost to the animal products industry. Not so any more. Abundance of feedstuffs does not produce favorable prices for better animal finishing. The old law of supply and demand is still true, but its effect is still suspended. The fact that we have about 20 percent more feed per animal unit this year than was available five years ago doesn't help Mrs. America's market-basket price, either. Guess why!

NEW CUSTOMERS—Farm Credit Administration tells us that nearly 3,000,000 people bought a large part of their needed supplies through about 9,000 local buying co-ops. Major purchases for their members were, of course, fertilizer, feed, fuel, seed and equipment. But processed food is a significant item in many cases. This huge potential market is described by FCA in its Miscellaneous Report 141, titled *Handbook on Major Regional Farm Supply Purchasing Cooperatives, 1948 and 1949.* It can be had for the asking from Farm Credit Administration, Washington 25, D. C.

RADIATED HENS—Exposed to ultraviolet light, hens show a marked increase in egg production, according to Bureau of Animal Industry. The experiments were begun to reduce the number of airborne bacteria in a poultry house. But the most important result found was the stimulus to the hen. It looks as though poultrymen will have to take a college course in radiology and ultraviolet light.

MORE "JACK SPRATS"—Leaner cuts of pork now command a definitely more favorable market price than comparable fat cuts. This trend, which has become more and more evident during the 20 years past, is now reaching a significant stage on bacon. Federal officials express serious concern as to what can be done about the matter, unless hogs are finished at a lighter weight, yielding more lean cuts. One official even goes so far as to ask whether "bacon is going the way of lard?"

—R. S. McBride, Washington, D. C.

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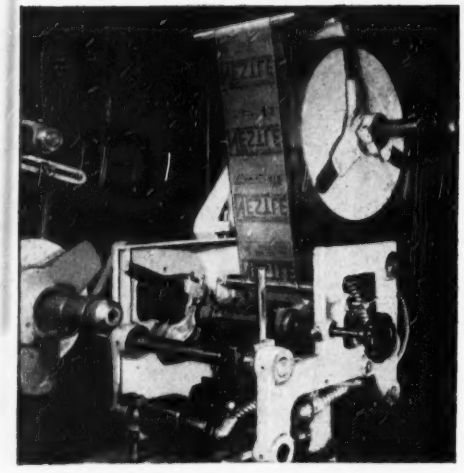

SAVES WRAPPING MATERIAL!

At the Peter Cailler Kohler Swiss Chocolate Co. plant in Fulton, N. Y., Nestle chocolate bars are quickly wrapped in this packaging machine. Here, G-E cut-off register control has meant a big saving in wrapping material, plus an increased production rate, over the mechanical method previously used, which often wasted material through poor register and periodic jams.

G-E register controls—cut-off, side, and color—boost packaging speed, maintain pin-point accuracy, cut waste due to rejects!

In these days of self-service retailing, your product's "buy-appeal" is far greater when you package it in a neat, attractive wrapper—precision printed and cut with General Electric register controls. Automatic in operation, these electronic aids for food packaging also give you these advantages:

Increased production through automatic operation and higher machine speeds. *Lower material and labor costs* which often justify the equipment's entire cost. *Low maintenance* due to few moving parts, with automatically-maintained register eliminating need for constant visual inspection. *Easy operation* that requires no special training, enables operators to devote more time to other duties. *Maximum flexibility,* permitting controls to work equally well on paper, cellophane, metal foil, or cloth.

Use *cut-off register control* for your wrapping operations, *side-register control* for your slitters or wherever the web must be guided, and, if you do your own printing, *color-regis'.. control* for your web-fed gravure or offset presses. Ask your G-E food industry specialist how to apply these G-E register controls to boost output, cut costs in packaging *your* food products. *Apparatus Department, General Electric Company, Schenectady 5, N. Y.*

GENERAL ELECTRIC

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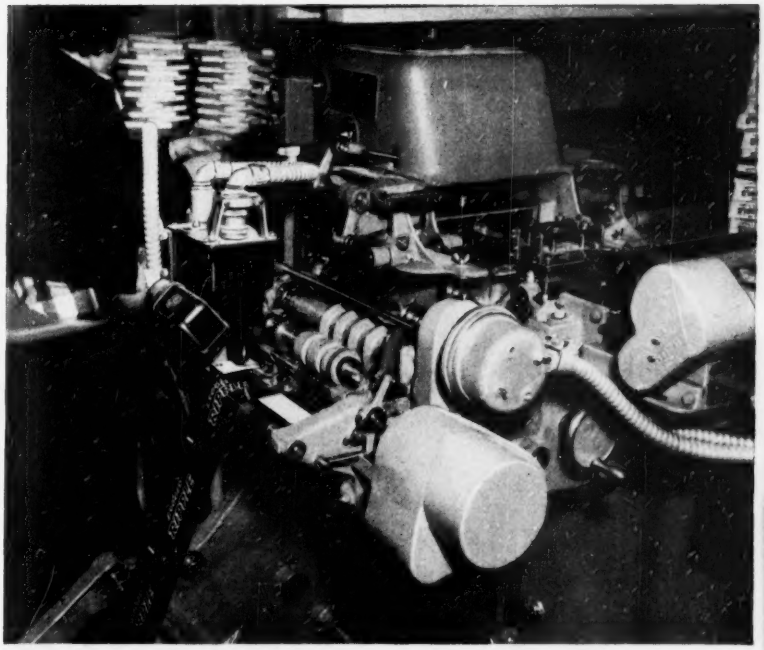
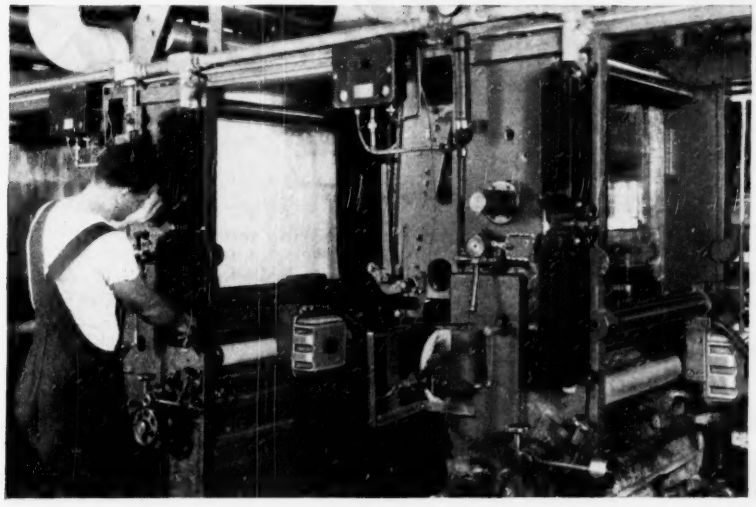
SAVES MANHOURS!

Where eight people were once needed at the Golden Nugget Sweets, Ltd., plant in San Francisco to hand wrap and box candy bars, only two have been needed since the installation of a wrapping machine with G-E cut-off register control. Since register is maintained automatically, the control eliminates the need for constant visual inspection. Moreover, it permits wrapping as many as 115 candy bars per minute while cutting the preprinted paper roll to exact lengths and precisely positioning the printed design. Electronically controlled, this G-E device has few wearing parts, requires but little maintenance.





SAVES PRODUCTION TIME!

At Milprint, Inc., in Milwaukee, which prints multi-color wrappers on a continuous roll for use by food packers, G-E color-register control has permitted a substantial increase in press speeds. Close register is held on this rotary gravure press even on such difficult materials as cellophane, pliofilm, and cellulose acetate. As a result, this company calculates the saving in rejects will more than pay for the G-E equipment within a year.

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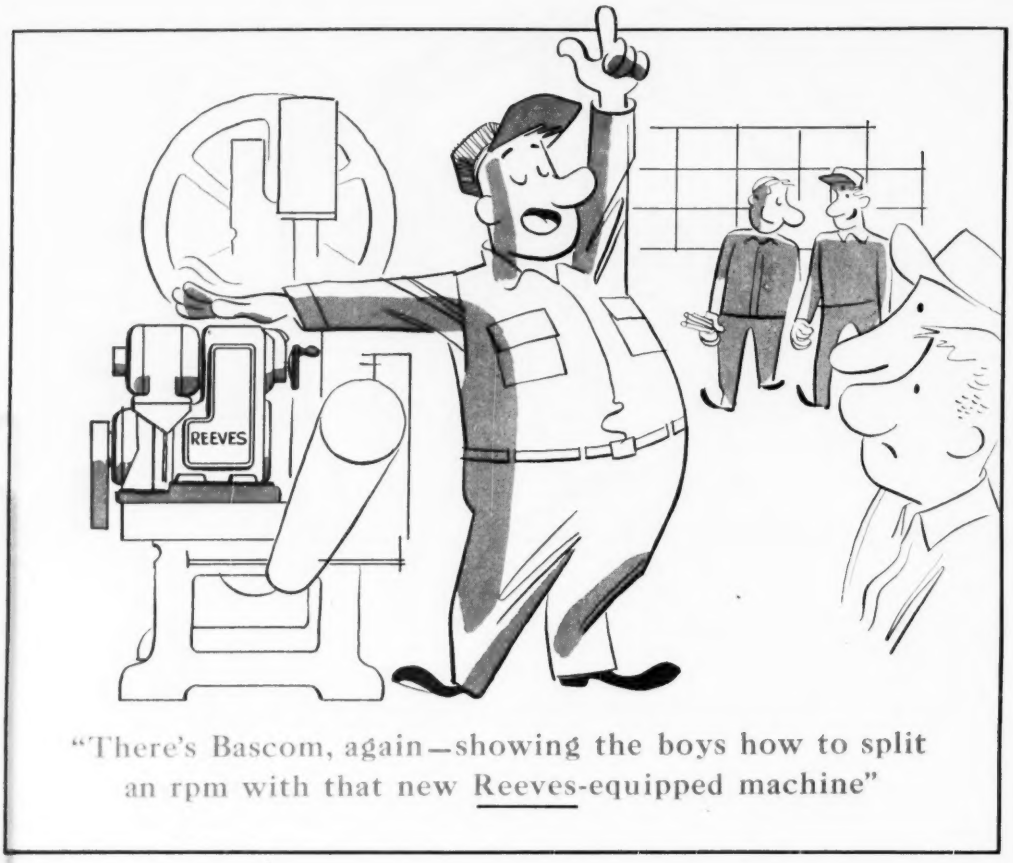

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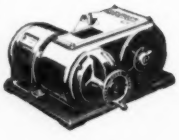

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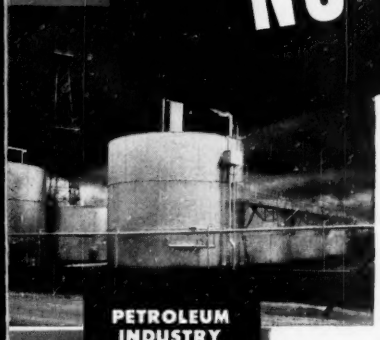

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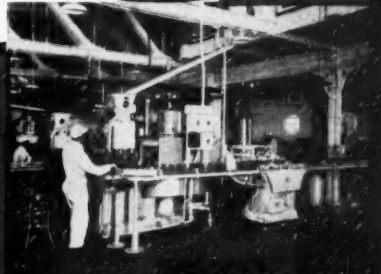
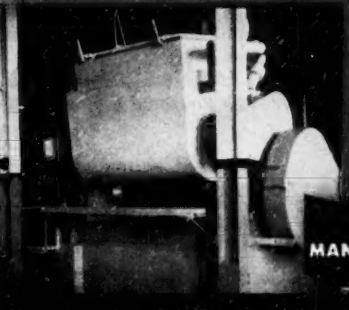


BEVERAGE PLANTS



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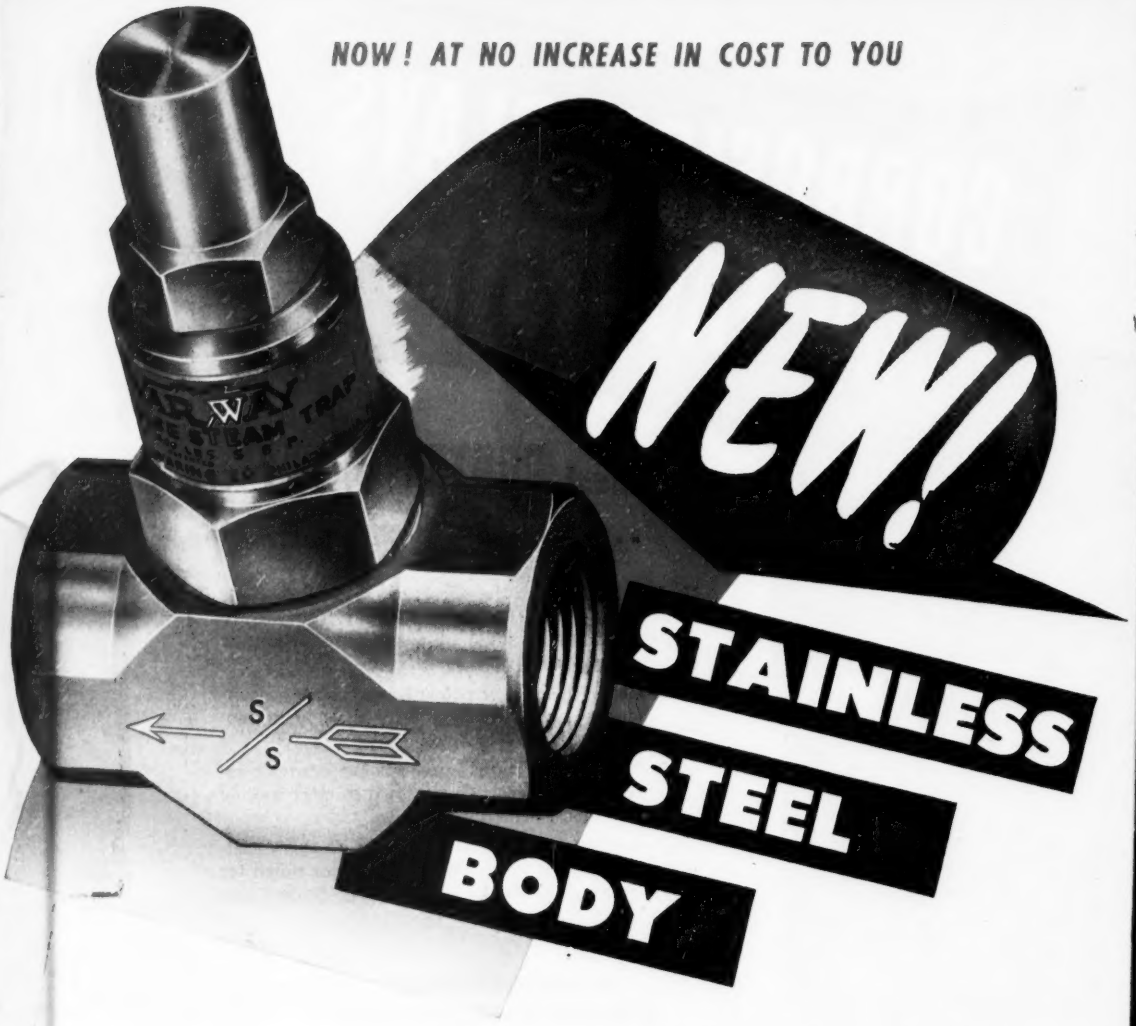


Makes a good steam trap better

Nearly 650,000 Yarway Impulse Steam Traps have already been installed—proof that they are doing a good job.

Now a *stainless steel* body makes this famous little trap even *better—at no increase in cost.*

Better in *wear*, better in *service*. Users will find Yarways require less maintenance than ever. All parts are wear-resistant, practically wear-proof. There is only one moving part, a small, stainless steel, heat-treated valve. Important, too—Yarway Impulse Traps are *suitable for all pressures up to specified maximum without change of valve or seat.*

Other popular advantages are *small size, light weight, easy installation* and *low cost.* Often it costs *less* to buy a new Yarway trap than to repair an old, ordinary trap.

In performance—ask any user. They all say Yarways are the traps that *get equipment hotter sooner and keep it hot!*

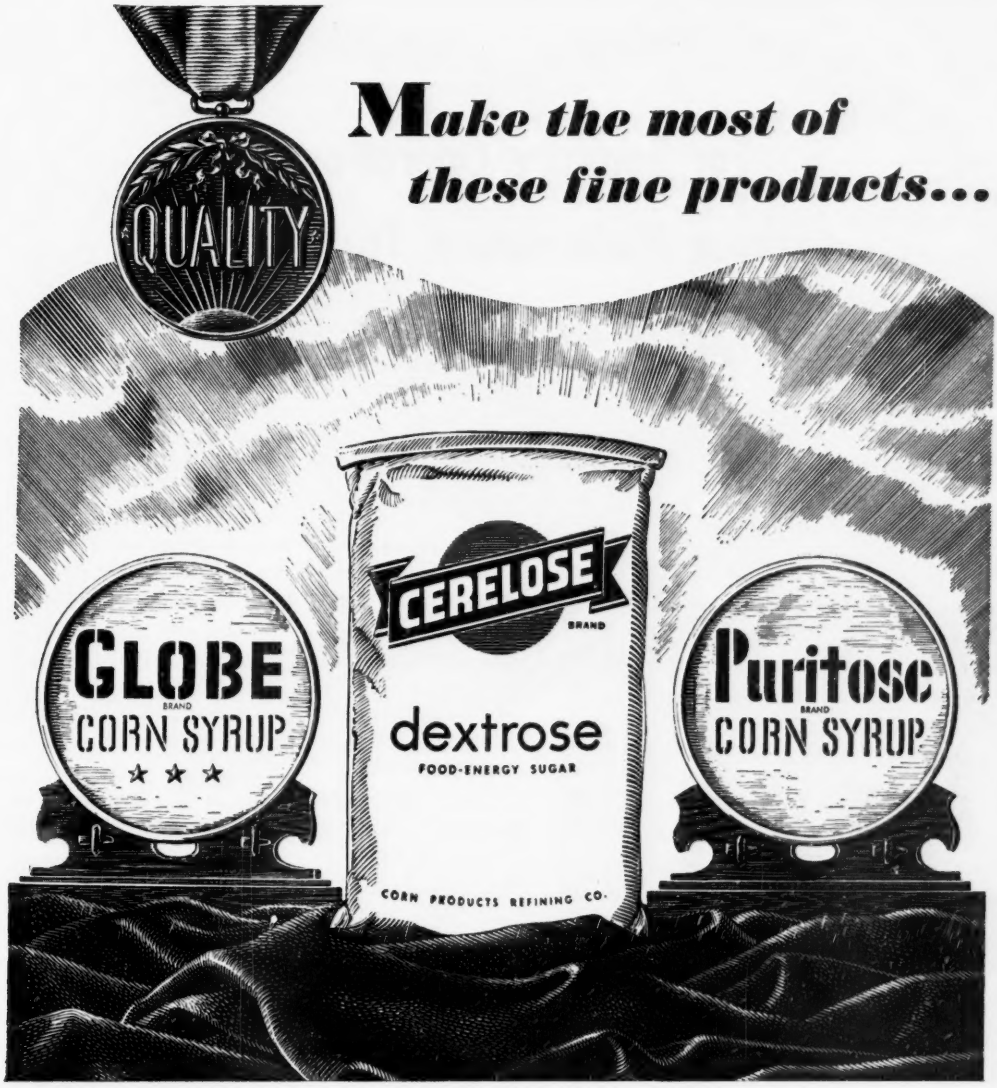
For better steam trap performance, try *new* stainless steel Yarways.

YARWAY IMPULSE STEAM TRAPS ARE SOLD BY OVER 200 DISTRIBUTORS. THERE IS ONE NEAR YOU.

Write for name and address.

YARNALL-WARING COMPANY
127 Mermaid Avenue, Philadelphia 18, Pa.

YARWAY IMPULSE STEAM TRAP



Make the most of these facilities!

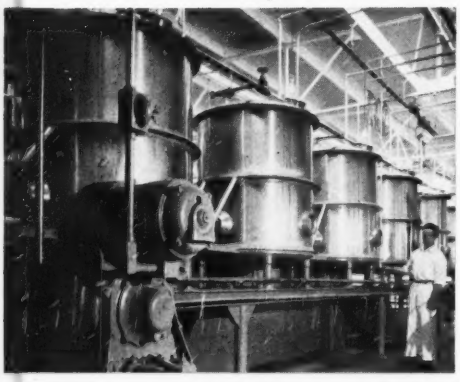
Globe, Cerelose, Puritose, Buffalo and Hudson River are registered trade-marks of Corn Products Refining Company, New York, N. Y.

Continuing basic research, with the foremost research men in the industry directing a comprehensive program in corn products chemistry.

Technical and engineering services, to help you apply new methods, new products and new procedures in your production. On-the-spot studies can be made by highly skilled technical men ...no obligation to you. Just write Technical Service Department.

CORN PRODUCTS REFINING COMPANY, 17 BATTERY PLACE, NEW YORK 4, N. Y.

For Sanitary Operation without Maintenance Troubles— *Carpenter* Stainless Tubing



Product purity is safeguarded and maintenance problems are things of the past, when lines are made from Carpenter Stainless Tubing or Pipe.

Freedom from metallic contamination, and the easy-to-clean features of Stainless, are yours when you call the nearest Carpenter Stainless Tubing Distributor.

Clean-up time is being cut down in many a plant where Carpenter Stainless Tubing and Pipe are specified as standard equipment. Easy assembly with standard valves and fittings is still another advantage. When pipe lines have to be dismantled, the job is easy and quick.

Analysis, Tolerance and Finish are guaranteed to be as ordered on every shipment of Carpenter Stainless Tubing or Pipe.

For information on corrosion resistance, sizes, analyses, etc., write for a copy of the Carpenter Stainless Tubing Data File. Just drop us a note on your company letterhead.

THE CARPENTER STEEL COMPANY
Alloy Tube Division, Union, N. J.
Export Department: Woolworth Bldg., New York 7, N. Y., "CARSTEELCO"

Carpenter
STAINLESS TUBING

—guaranteed on every shipment

It's a good idea to call your nearest Carpenter Distributor when you need information about Stainless Tubing or Pipe.

HEYDEN PRODUCTS

FOR ASSURED QUALITY IN FOODS

SODIUM BENZOATE U.S.P.

A standard preservative of food quality, flavor and color. Available as powder or flakes. Shipped in 100 lb. bbls.; 50 and 25 lb. fiber drums.

BENZALDEHYDE N.F.

Synthetic oil of bitter almonds. For flavoring and aroma in canned fruits, fruit beverages, cake mixes, candies. Shipped in 425 lb. drums, 100 lb. carboys, and 50 and 25 lb. boxed tins.

SACCHARIN

U.S.P. Powder and Saccharin Sodium U.S.P. Powder and Granular.

BENZOIC ACID

Widely used as a preserving agent. Shipped in 100 lb. bbls.; 50 and 25 lb. fiber drums.

METHYL SALICYLATE U.S.P.

Synthetic oil of wintergreen. For flavoring confectionery and beverages. Shipped in 500 lb. drums and 50 lb. tins.

PROPYL GALLATE

A powerful antioxidant serving as a stabilizer for edible oils and fats, emulsions, waxes, etc. Shipped in 200, 100, 50 and 25 lb. fiber drums.

HEYDEN
CHEMICAL CORPORATION
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CHICAGO 6 • PHILADELPHIA 3 • SAN FRANCISCO 11 • RUMFORD 16, R. I.

FINE HEYDEN CHEMICALS

Benzaldehyde • Benzoates • Benzyl Chloride • Benzoates
Chlorinated Aromatics • Chlorobenzenes • Creosotes • 2,4-D • Formaldehyde
Formic Acid • Glycerophosphates • Guaiacols • Hexamethylenetetramine
Medicinal Colloids • Methylene Disalicylic Acid • Paraformaldehyde
Parahydroxybenzoates • Penicillins • Pentaerythritols • Propyl Gallate
Quadrafos • Salicylates • Salicylic Acid • Streptomycin

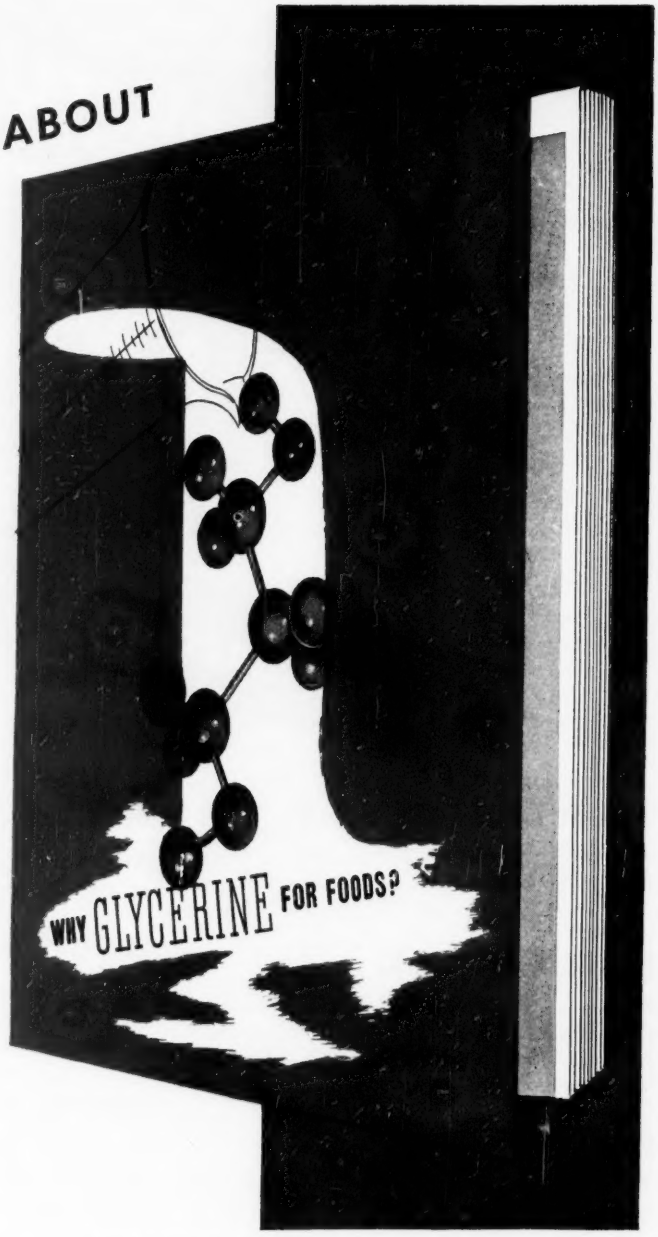
QUICK FACTS ABOUT Glycerine!

a practical review of GLYCERINE applications in Foods—

WHERE? . . . How? . . . Why? . . . If you're looking for the answers to these questions on glycerine usage in food processing—here's the most up-to-date information available!

"Why Glycerine for Foods?" has been reviewed by a number of technical consultants as well as the Research Laboratories of the Glycerine Producers' Association. Contains detailed information by charts and tables of the physical properties of glycerine—the origin, development, and chemistry of this amazingly useful alcohol—grades and their applications. 16 pages of practical, useful data!

Whether you now use glycerine or just wonder about its possibilities . . . whether you're in management, production, or research . . . an expert on glycerine, or thoroughly unfamiliar with the subject—you'll want this informative booklet. Write for your free copy — today! *Address: Dept. 8, Glycerine Producers' Association, 295 Madison Avenue, New York 17, New York.*



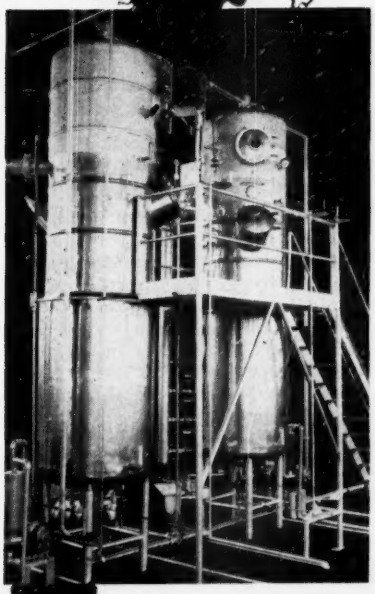
One of a series of five booklets on the industrial applications of glycerine. Also available on request: Why Glycerine? (a general survey of all main uses) . . . Why Glycerine for Alkyd Resins and Ester Gums? . . . Why Glycerine for Drugs and Cosmetics? . . . Why Glycerine for Textiles?

GLYCERINE PRODUCERS' ASSOCIATION

295 Madison Avenue, New York 17, N. Y.

"Vineyard fresh" flavor . . . . .

for grape juice and grape jelly preserved with Stainless Steel



WHEN the Welch Grape Juice Co. began processing grape products at San Leandro, Calif., last year, they took every precaution to see that their grape juice and grape jelly retained the delicate, *natural* flavor that has made them famous. That's why preparation of these grape products is handled entirely in Stainless Steel equipment.

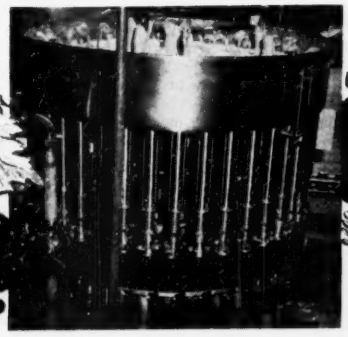
Raw grape juice is stored in Stainless Steel tanks . . . pasteurized in Stainless equipment . . . bottled in a rotary filler whose contact parts are all Stainless. In jelly production, the stock is mixed with sugar in Stainless kettles . . . cooked in Stainless vacuum vessels . . . travels through Stainless pipes . . . is packed in jars in a Stainless Steel filler.

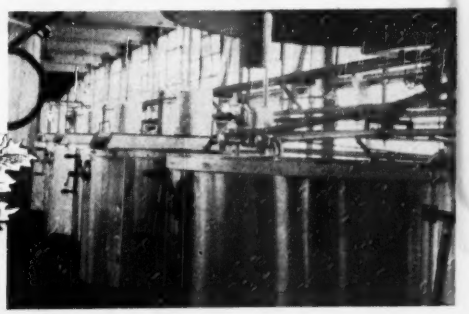
Stainless Steel equipment is the surest way to safeguard the flavor, color and purity of any type of food product. Its bright, sparkling surface is easy to clean and keep clean. And Stainless Steel's unequalled resistance to corrosion, to wear and to heat practically eliminates repairs, replacement and plant shutdowns due to equipment failures.

Stainless Steel's versatility and ease of cleaning make it possible for you to use the same equipment in processing a variety of products. For example, Welch plans to use its San Leandro equipment for processing 12 other preserve items in addition to grape products.

When you are ordering Stainless Steel processing equipment, be sure that your fabricator uses U·S·S Stainless Steel. This perfected, service-tested material is available in a complete range of forms — sheets, strip, plates, bars, wire, pipe, tubing and special sections—as well as a variety of compositions and finishes. As a result, your fabricator can use the latest designs and the most modern techniques of fabrication. It all adds up to economy and better performance for you.

FABRICATED from Stainless Steel sheet, strip, pipe and tubing, these twin vacuum pans protect volatile flavor esters while making possible economical concentration of grape products.





TANKS for storing grape juice before processing are fabricated from Stainless Steel.

HOT GRAPE JELLY is delivered to the filler through Stainless Steel tubing.

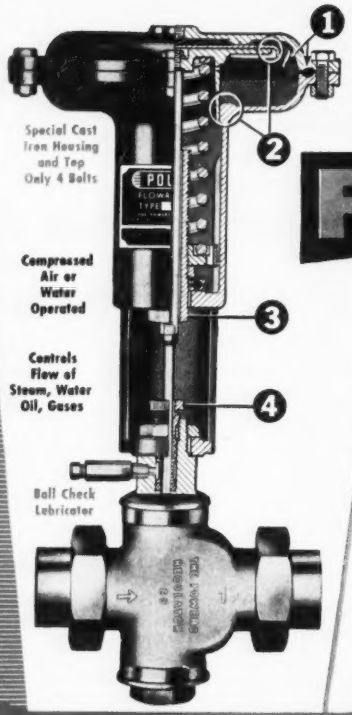
AMERICAN STEEL & WIRE COMPANY, GENERAL OFFICES: CLEVELAND, OHIO · CARNEGIE-ILLINOIS STEEL CORPORATION, PITTSBURGH & CHICAGO
COLUMBIA STEEL COMPANY, SAN FRANCISCO · NATIONAL TUBE COMPANY, PITTSBURGH · TENNESSEE COAL, IRON & RAILROAD COMPANY, BIRMINGHAM
UNITED STATES STEEL SUPPLY COMPANY, WAREHOUSE DISTRIBUTORS, COAST-TO-COAST · UNITED STATES STEEL EXPORT COMPANY NEW YORK

USS

U·S·S STAINLESS STEEL

SHEETS · STRIP · PLATES · BARS · BILLETS · PIPE · TUBES · WIRE · SPECIAL SECTIONS

UNITED STATES STEEL



POWERS **FLOWRITE** VALVE

VALVE TOP—Durable moulded neoprene diaphragm (1) has positive sealing bead which provides increased sealing action with increasing control pressure. Efficient diaphragm form insures ample and constant operating power thru full travel. Piston Plate Assembly (2) has a free floating thrust plate which absorbs side thrust. Closely guided piston plate maintains stem in accurate alignment.

3 **ADJUSTING SCREW**—Ball bearing non-rising type. Easily accessible, 180° turning radius with starting pressure adjustable from 0 to 17 psi. Has enclosed rust proofed steel spring for full travel in 5 or 10 psi. control pressure change.

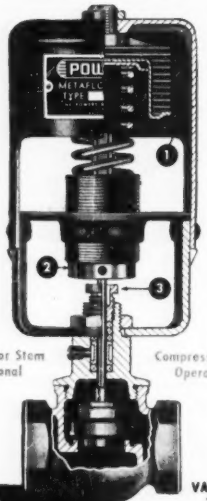
4 **BONNET ASSEMBLY**—Polished stainless steel stem in preformed lubricated metallic packing insures long life and low hysteresis.

VARIETY of VALVE BODIES — Sizes ½" thru 8"—For line pressures below 250 psi. Rugged construction to withstand piping strains. Single seat or double seat, bronze and stainless steel trim. Double unions and flanged ends. Available normally open (direct acting) or normally closed (reverse acting) and 3-way type valves.

POWERS

Get TOP Performance WITH THESE BETTER Valve Tops AND Reduce Maintenance

Packless Valves Available



POWERS **METAFLOW** VALVE

VALVE SIZES— ½" thru 2"

Bronze bodies, screwed ends. Rugged construction to withstand piping strains.

POWERS *Metaflow Valves* are small, sturdy, light-weight, reasonably priced, suitable for many control applications where the pressure differential does not exceed 75 lbs. per square inch.

1. **HOUSING**—High strength aluminum alloy. Hydraulically formed long life brass bellows provides smooth and powerful stroke.

2. **ADJUSTING SCREW**—Brass with rust proofed steel spring having 15 lbs. adjustment range to give proper sequence operation where required.

3. **BONNET ASSEMBLY**—Polished stainless steel stem in preformed lubricated metallic packing insures long life and low hysteresis.

TRIM—Composition disc with brass integral seat and self-aligning disc holder. Available normally open (direct acting) or normally closed (reverse acting), and 3-way.

METAFLOW NO-PAK VALVES prevent leakage of inflammable or harmful liquids or gases and provide vacuum protection. Are suitable for use with Freon, oil, gasoline, non-corrosive gases, hot or cold water and low pressure steam.

Phone or Write Nearest Office for Prices

THE POWERS REGULATOR CO.

OFFICES IN OVER 50 CITIES • See Your Phone Book

CHICAGO 14, ILL., 2793 Greenview Ave. • **NEW YORK 17, N.Y.,** 231 E. 46th St.
LOS ANGELES 5, CAL., 1808 West 8th St. • **TORONTO, ONT.,** 195 Spadina Ave.
MEXICO, D. F., Edificio "La Nacional" 601

OVER 58 YEARS OF PNEUMATIC TEMPERATURE CONTROL

(FM3)

* * * *Ask Mrs. Homemaker—she'll tell you* * * *

"I choose enriched and fortified foods for my family"

AMERICAN housewives enthusiastically endorse the Food Industry's program of enrichment and fortification. More and more, they select *enriched* and *fortified* foods for their family tables.

And their judgment has again been proved correct by the results of the large-scale Newfoundland Nutrition Surveys. These studies reaffirmed that enriched and fortified foods promote *healthier* bodies, sharply reduced infant mortality, lower tuberculosis and over-all death rates — improvement in both the quantity and quality of life.

When you enrich or fortify with Merck Vitamin Products you *know* that the faith of millions of American women is fully protected. Merck Vitamin Products come from the same organization that pioneered in the research and large-scale production of thiamine, riboflavin, niacin, vitamin C, and other important nutrients. And now, the most recent contribution is thiamine mononitrate, a form of thiamine that has the advantage of greater stability in certain food applications.

With the enrichment program, as well as general food fortification, steadily growing in stature, Merck continues to lead in every distinct, forward step.

Merck Vitamin Products for Enrichment and Fortification

VITAMIN B_1
Thiamine Hydrochloride
Thiamine Mononitrate

RIBOFLAVIN
(Vitamin B_2)

NIACIN
(Nicotinic Acid)

ASCORBIC ACID
(Vitamin C)

Merck Enrichment Ingredients for Millers, Bakers, Cereal and Macaroni Manufacturers • Merck Vitamin Mixtures for Flour Enrichment • Merck Bread-Enrichment Wafers • Merck Vitamin Mixtures for Corn-Products Enrichment • Merck Vitamin Mixtures and Wafers for Macaroni Enrichment.

Merck Knows Vitamins

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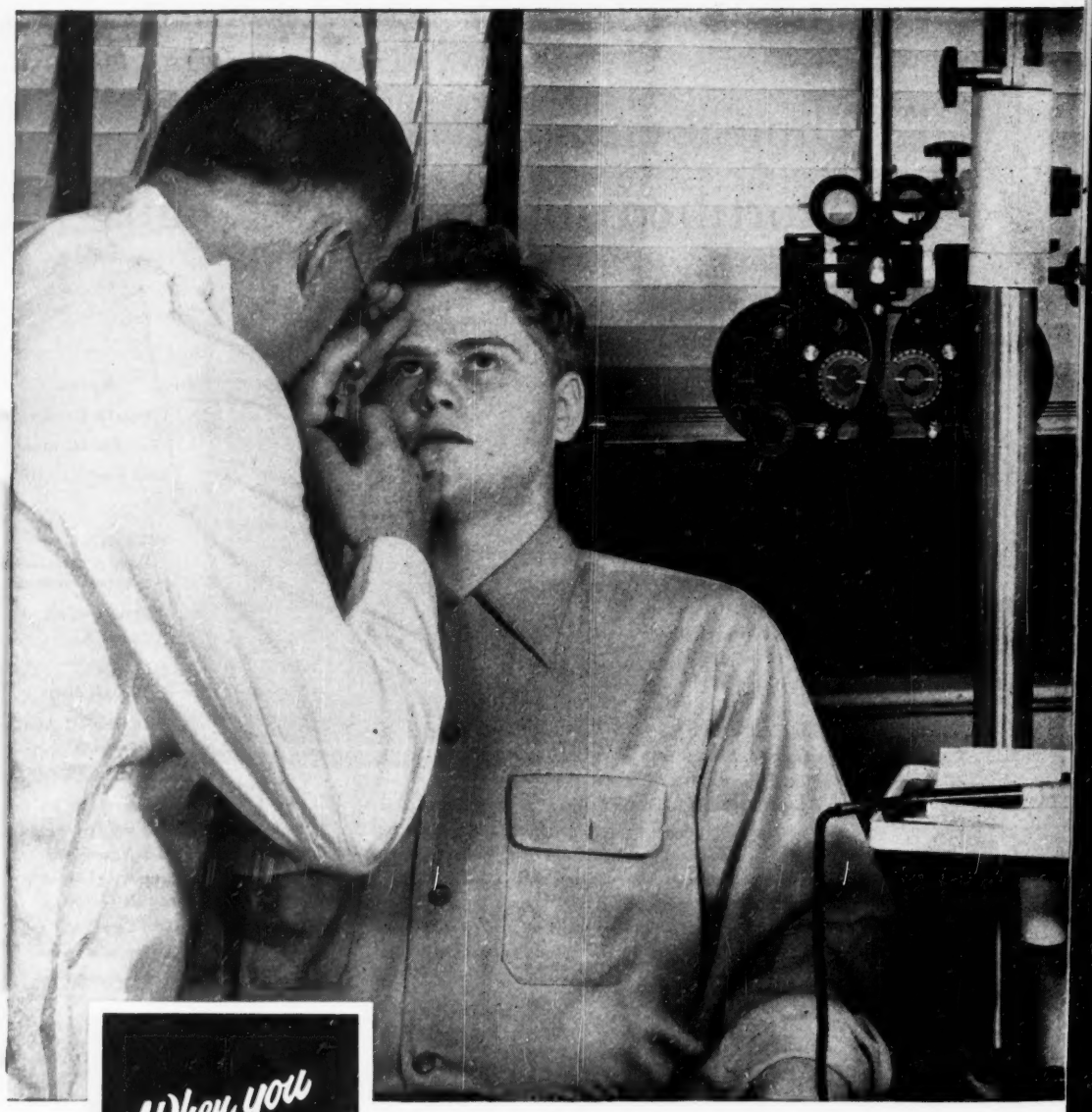
In Canada:
MERCK & CO. Limited Montreal • Toronto • Valleyfield

MERCK

Merck Vitamin Products for Enrichment and Fortification



When you want the BEST go to the BEST

And for Packaging it's GLASS

The transparent glass package displays your products with all their colorful eye and appetite appeal. High in chemical durability, it does not change their taste or aroma, will not rust, corrode or leak.
Easy to open, easy to use, easy to reseal to protect unused portions, it makes the most convenient package. It lends itself to individuality in size and shape, hence is adaptable to any product.
Preferred by consumers because it is sanitary and convenient . . . by retailers because of its sales and merchandising advantages.
Anchor Hocking Glass Corporation, Lancaster, Ohio.

Anchorglass*

PLAIN ROUND JARS

For packaging pickles or mayonnaise, fruits, vegetables and many other food products, standard *Anchorglass* Plain Round Jars are ideal. They are available in 26 capacities, from 4 oz. to 128 oz.—

Tough and sturdy, they are designed to move efficiently through every packing operation. Consistency in manufacture, uniform distribution of glass, accurate annealing, strict quality control from selection of raw materials to finished product—result in uniformly strong, light-weight containers. Regardless of what you pack, there is an *Anchorglass* container that will completely meet your requirements.

ANCHOR

AMERSEAL* CAPS

For dependable airtight, leakproof sealing of mayonnaise, salad dressings, syrups and many other food products not effected by bacterial decomposition use *Anchor* Amerseal Caps. Amerseals speed application—no matching or adjusting to threads is necessary—a quick quarter-turn seals. Your customers like this cap because a quarter-turn, a simple twist of the wrist, removes it. Knife-like action of the cap lugs easily breaks the contact. A reverse quarter-turn reseals time after time. Let us tell you more about the advantages and economies of *Anchor* Amerseal Caps and *Anchorglass* containers.

*Trade-Mark

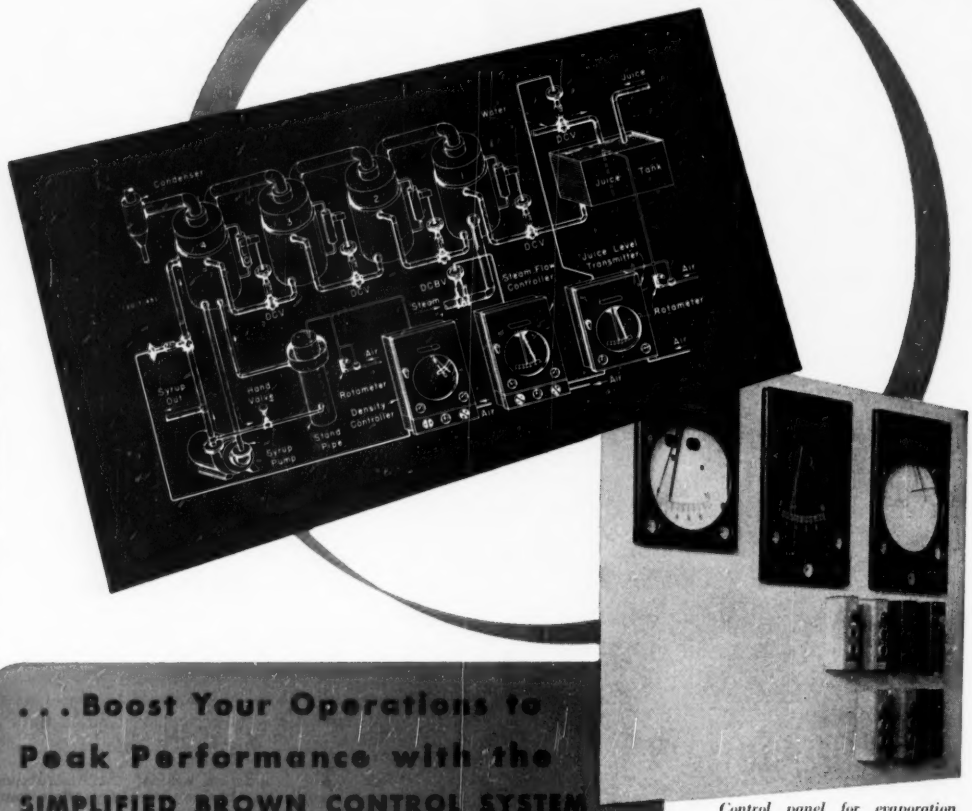
For the BEST in Glass Packaging *it's*

ANCHOR HOCKING

"THE MOST FAMOUS NAME IN GLASS!"

NON-STOP EVAPORATION

AT MAXIMUM CAPACITY



. . . Boost Your Operations to Peak Performance with the SIMPLIFIED BROWN CONTROL SYSTEM

Control panel for evaporation system at the Honokaa Sugar Co., Honokaa, Hawaii . . . installed by Honolulu Iron Works.

A BROWN evaporator control system pays big dividends when the chips are down . . . when production is at its peak and optimum evaporation has a marked influence on all other operations. A temperamental multiple-effect evaporator can eat up profits in a very short time.

Service records of Brown control systems show great improvement over the most efficient manually operated station and set new standards of performance for automatic control . . . such as density held within .002 sp.g., without shutdowns, without supervision.

Complete Instrumentation plus application know-how and field experience enables Honeywell engineers to handle the entire job . . . with an unbiased selection of the right equipment for each installation. The net result adds up to increased production at lower cost, for almost any evaporator system . . . through engineering, instruments, valves, controls and service from one organization.

Call in your local Honeywell engineer for a discussion of your application today . . . he is as near as your phone. MINNEAPOLIS-HONEYWELL REGULATOR CO., *Industrial Division*, 4502 Wayne Ave., Phila. 44, Pa. Offices in more than 80 principal cities of the United States, Canada and throughout the world.

MINNEAPOLIS **Honeywell**

BROWN INSTRUMENTS

Guard Against Atmospheric Hazards...

WITH

Century PROTECTED MOTORS

Drip Proof

Splash Proof

Totally Enclosed Fan Cooled

Explosion Proof

Century Motors

ALTERNATING CURRENT MOTORS

POLYPHASE

Squirrel Cage Induction—1/6 to 400 H.P.
Wound Rotor Motors—1 to 400 H.P.
Synchronous Motors—20 to 150 H.P.

SINGLE PHASE

Split Phase Induction—1/6, 1/4, 1/3 H.P.
Capacitor—1/6 to 20 H.P.
Repulsion Start, Brush Lifting, Induction—1/2 to 20 H.P.

DIRECT CURRENT MOTORS

1/6 to 300 H.P.

GENERATORS

AC, .63 to 250 KVA
DC, .75 to 200 KW

GEAR MOTORS

1/8 to 1-1/2 H.P.

MOTOR GENERATOR SETS

AC to DC, AC to AC
DC to DC, DC to AC

Open Protected, Splash Proof, Totally Enclosed Fan Cooled, Explosion Proof.

Ball Bearing motors are factory lubricated for several years' normal service. Bearing housing construction permits easy re-lubrication when unusual service demands it.

CE-673

To guard your production against the destructive effects of atmospheric hazards, Century offers four types of protective motor frames.

DRIP PROOF—meets the requirements of most installations. Use it where operating conditions are relatively clean and dry. Top half of the frame is enclosed to keep out falling solids and dripping liquids.

SPLASH PROOF—keeps splashing liquids out of the motor even when the frame is washed with the full force of a hose. Use Century Splash Proof motors indoors or outdoors.

TOTALLY ENCLOSED FAN COOLED—resists the hazards of abnormal concentrations of dusts, powders, grit, oil mists, acid and alkali fumes.

EXPLOSION PROOF—protects life and property in atmospheres charged with explosive dusts or vapors.

The properly selected protection with the wide variation of starting torque characteristics to choose from provides long operating life and improves the production of the driven equipment.

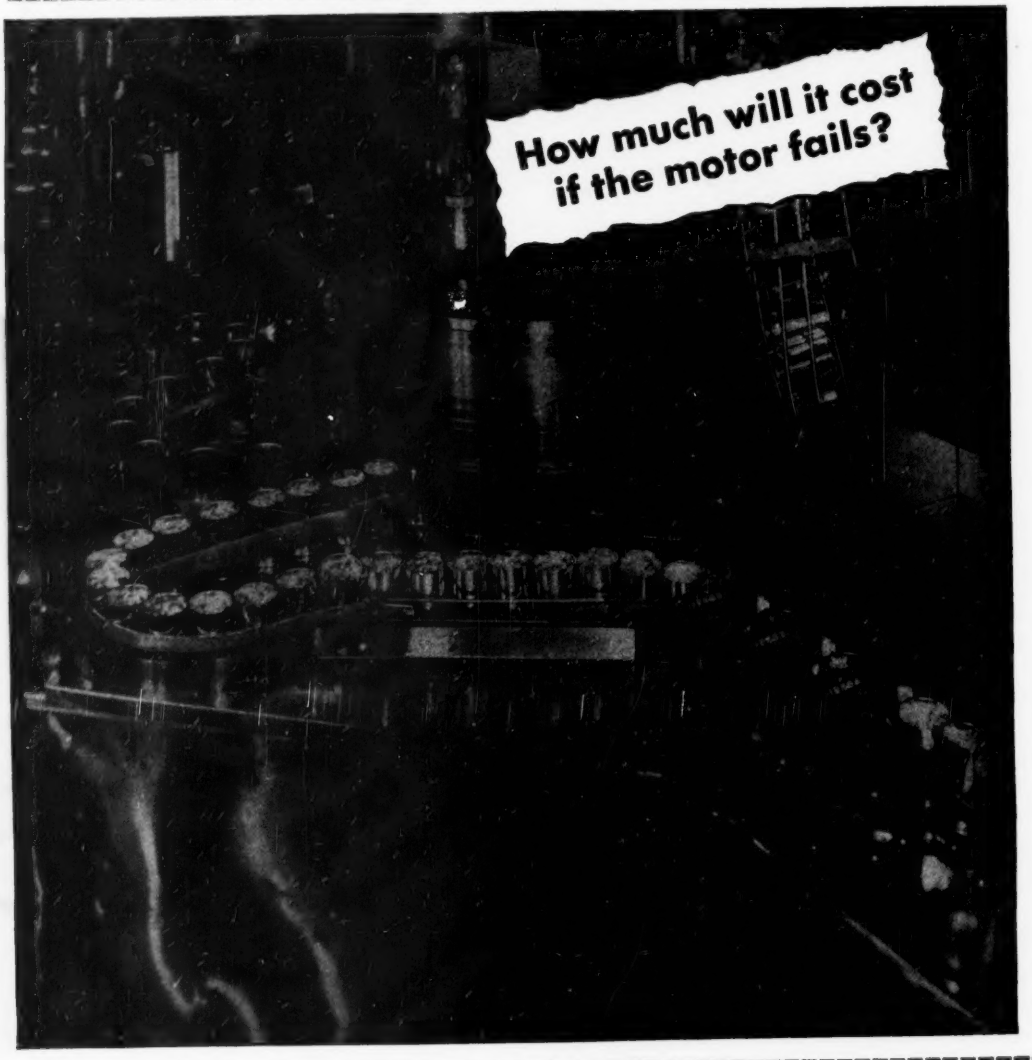
Century motors are available in a wide range of kinds and types—in sizes from ¼ to 400 horsepower—for single phase, polyphase and direct current applications.

Specify Century motors for all your electric power requirements.

CENTURY ELECTRIC CO. 1806 Pine St. • St. Louis 3, Mo.

Offices and Stock Points in Principal Cities

YOU CAN BE **SURE**.. IF IT'S
Westinghouse



HERE'S THOUGHT FOR FOOD

When a production line goes down in a food plant—costs skyrocket. Spoilages alone can add up to a $1000 an hour. And the down time may all be caused by one motor outage. Isn't that food for thought?

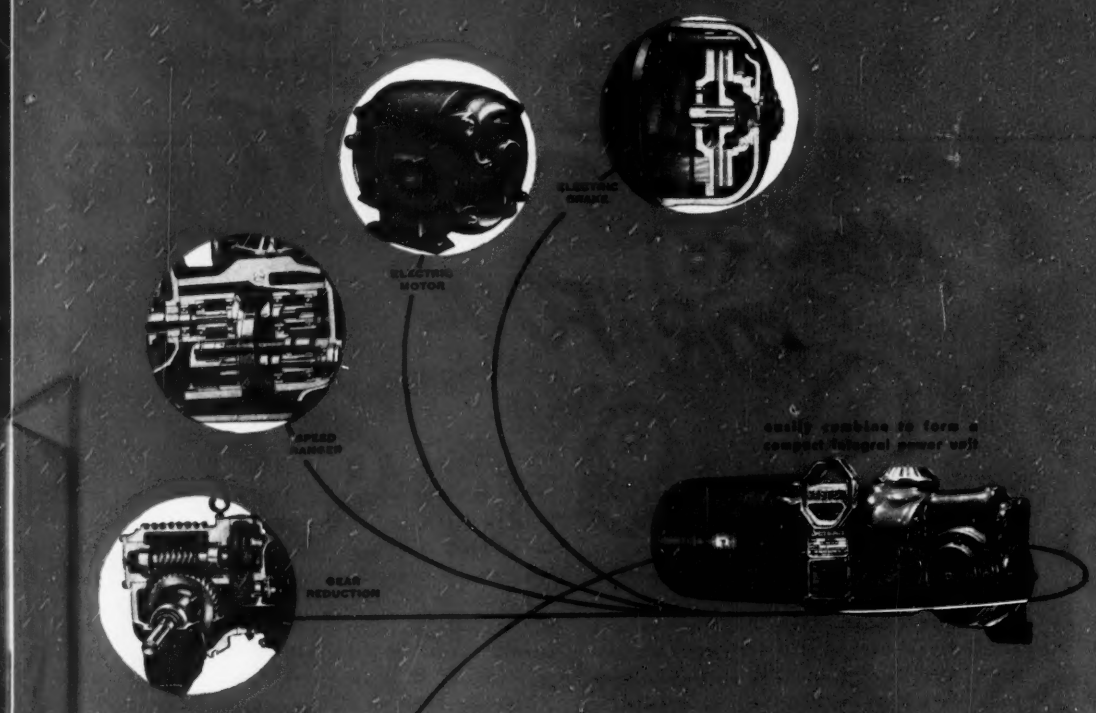
Take just a minute, then, to consider what a Life-Line can mean to your production line. Its extra "Life" features have the stamina to keep your equipment operating even under adverse conditions.

For example: Life-Line's heavy all-steel frames, brackets and feet, guard against physical shocks . . . against accidental blows. Pre-lubricated bearings eliminate faulty lubrication . . . save the time and cost of constant greasing attention. Stator windings—of Tufvar wire, extra-protected by multiple dips and bakes in Thermoset varnish—cut outages from oil, moisture, dirt and heat. In fact, records of nearly half a million Life-Line motors show an on-the-job performance—twice as good as the best motor built by Westinghouse in 58 years. That's a record of performance that is hard to beat—one that will certainly pay off on your production line.

And, important too, is the fact that Life-Line motors offer a complete line. Dripproof, splash-proof, totally-enclosed, fan-cooled and sanitary motors that meet 3-A specifications. Ask your Westinghouse representative for a presentation of the sound movie, "What Price Motors" and booklets B-4321 and B-3842, or write Westinghouse Electric Corp., P. O. Box 868, Pittsburgh 30, Pa.

J-21562

If you figure LIFE COSTS . . . you'll figure LIFE-LINE



make a good job Better

Don't put up with make-shift assemblies when it is so easy to get the RIGHT horsepower, the RIGHT shaft speed, the RIGHT construction features, the RIGHT mounting . . . all combined into one compact power package.

Master Motors, available in thousands on thousands of combinations of types and ratings, permit you to use a power drive on each job that's just right . . . a power drive that will add greatly to the compactness, appearance, and economy of each of your applications.

Use Master Motors to increase the salability of your motor-driven products... improve the economy and productivity of your plant equipment. They're the horsesense way to use horsepower.

THE MASTER ELECTRIC COMPANY

DAYTON 1, OHIO

which adds greatly to the economy, safety, compactness and appearance of the finished product.

Uniform goodness
...the year around!

ARCHER Soybean Cooking Oils and Salad Oils aren't made in batches. Instead, these two outstanding oils are made by *continuous process.* That's the secret of dependable, uniform quality. Right now, in the refining towers of ADM's big, modern plant at Decatur, Illinois, a continuous, never-ending ribbon of soybean oil is being vacuum processed. This is the "last word" in chemical and mechanical quality control. That means that every shipment of ARCHER "S" and ARCHER "C" you receive will be just as clear, and just as bland as the last.

This year . . . next year . . . or the year after, you can count on ARCHER Salad and Cooking Oils. Deodorized and winterized, they'll always give your product the same, uniform, outstanding quality that has made the Archer name famous in the vegetable oil industry.

Archer
SOYBEAN SALAD and COOKING OILS

Taste THEM!
Smell THEM!
Try THEM!...

Want to see for yourself? Just mail the coupon today.

ARCHER • DANIELS • MIDLAND CO.
600 Roanoke Building • Minneapolis, Minnesota

Please send samples of ☐ ARCHER "S" Soybean Salad Oil. ☐ ARCHER "C" Soybean Cooking Oil.

Name_____
Company_____
Address_____
City_____ Zone____ State____

SIMPSON Mix-Mullers®

assure constant uniformity

for ALL TYPES of Prepared Mixes

CAKE mix . . . pie mix . . . muffin mix . . . doughnut mix . . . they all receive that same thorough blending when you use the proven *mulling* process available only with Simpson *Mix-Mullers.* A product of unvarying uniformity is assured . . . balled materials or unmixed smears that often result from ordinary mixing methods are eliminated. Thus, your finished product will continually give users the same quality, box after box, that means increased repeat order business for you.

Not only do Simpson Mix-Mullers give you highly *controlled* mixing, but they do the job *faster* and at *less cost.* Experienced users can tell you that these high production machines are the ideal answer for prepared mixes.

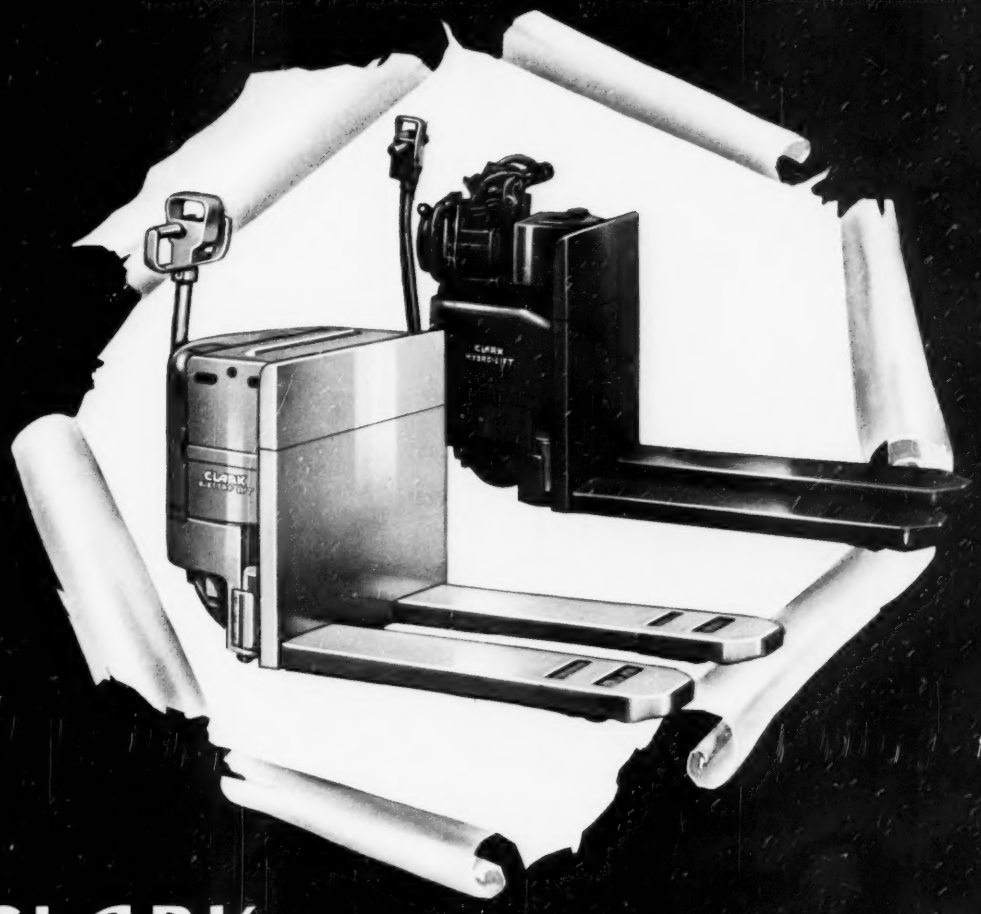
Consult a National Engineer today about your mixing problems. His specialized experience is available to you without obligation. Write for details, or send for a copy of our latest catalog.

SIMPSON Mix-Muller® Division

NATIONAL ENGINEERING CO., 614 Machinery Hall Bldg., Chicago 6, Ill.

Manufacturers and Selling Agents for Continental European Countries—George Fischer Limited, Schaffhausen, Switzerland. For the British Possessions, Excluding Canada and Australia—August's Limited, Halifax, England. For Canada—Dominion Engineering Co., Ltd., Montreal, Canada. For Australia and New Zealand—Gibson, Battle & Co., Pty., Ltd., Sydney, Australia.

NO OTHER HAND TRUCK HAS
SO MUCH POWER—SO SHORT A TURNING RADIUS!
PLUS TWO POWER TYPES—GAS OR ELECTRIC



CLARK
POWERED HAND TRUCKS

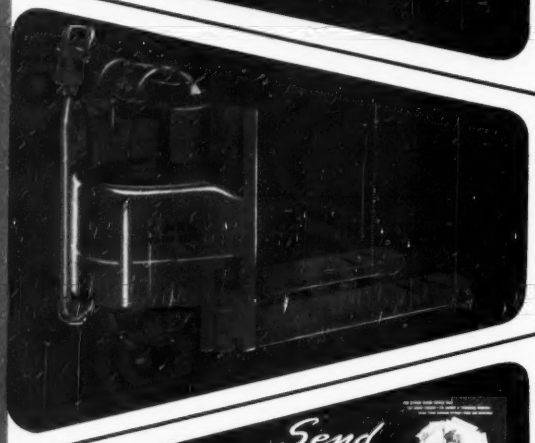
TURN
PAGE
FOR MORE
HAND TRUCK DETAILS

CLARK EQUIPMENT COMPANY, INDUSTRIAL TRUCK DIVISION
BATTLE CREEK, MICHIGAN

The NEW CLARK POWERED HAND TRUCKS

with the motor in the drive wheel

SHORTEST TURNING RADIUS — GREATEST POWER



TWO POWER TYPES

1 ELECTRO-LIFT

BATTERY POWER—ELECTRIC MOTOR DRIVE

New-type compound motor develops *more* power than any other hand truck . . . Economical consumption of power means longer work periods . . . Ample reserve power available when required . . . Automatic acceleration prevents abuse, provides smooth, fast "getaway" . . . Speed variations are slight with or without load—reducing operator fatigue . . . Soft, dynamic braking protects loads . . . Lift motor, pump, relief valve, check valve and sump in single compact unit . . . The *only* short truck with space for batteries up to and including 19-plate.

2 HYDRO-LIFT

GAS-ENGINE POWER—HYDRAULIC MOTOR DRIVE

Entirely new in the field of Materials Handling . . . 24-hour ramp service every day! . . . Hydraulic power infinitely smoother than any other type . . . Heavy-duty vane-type hydraulic units for continuous efficiency and long life . . . Effortless finger-tip reversal of direction . . . Automatic torque multiplication assures ample reserve power when needed . . . Hydraulic pump powers both drive and lift.

Compare CLARK machines with any and all others of their type! You'll find they excel because they give you:

- *Shortest turning radius*
- Shortest wheel base, giving better load distribution
- Greater underclearance to prevent "hanging up"
- Greatest accessibility for maintenance
- Reduced wear on rubber and floor because of larger (14") drive tire. This tire carries greater load, relieving burden on rollers
- Drive motor *mounted in the wheel*
- Compact, fully enclosed drive unit
- Lifting rams self-aligning and instantly accessible
- Rugged frame, and largest main carrier bearing
- Largest mechanical brake

The full story of these Clark Quality trucks, designed to *give industrial users what they want*, is told in a booklet that is yours for the asking. Just fill in the coupon, attach it to your letterhead and mail it.

CLARK ELECTRIC AND GAS POWERED FORK TRUCKS AND INDUSTRIAL TOWING TRACTORS

INDUSTRIAL TRUCK DIVISION • CLARK EQUIPMENT COMPANY • BATTLE CREEK 67, MICH.

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Firm Name _____

Street _____

City _____ Zone _____ State _____

AUTHORIZED CLARK INDUSTRIAL TRUCK PARTS AND SERVICE STATIONS IN STRATEGIC LOCATIONS

PRODUCTS OF CLARK—TRANSMISSIONS • FORK TRUCKS & TRACTORS • AXLE HOUSINGS • GEARS AND FORGINGS • RAILWAY CAR TRUCKS • ELECTRIC STEEL CASTINGS • AXLES • TRACTOR UNITS

PRINTED IN U.S.A.

Recent Dept. of Agriculture memo* permits use of flavor-heightening monosodium glutamate in cured hams, bacon, corned beef

NOW—IN ALL YOUR prepared meat food products—you may include Ac'cent (pure monosodium glutamate), the unique basic seasoning that remarkably heightens natural food flavors! Now, with *all* your processed meats, you may enjoy the important sales increases that Ac'cent already is producing for others.

For, in a recent supplement to its Memorandum #147*, the Meat Inspection Division of the Department of Agriculture has officially permitted the use of monosodium glutamate in the pumping pickle, cover pickle or dry cure mixture for all cured meats. Previous permission was granted for use in loaves, soups, stews, hash, sausage, luncheon meat and similar products. **Supplement No. 1, Memorandum No. 147, Meat Inspection Div., U. S. Department of Agriculture, June 6, 1950.*

AC'CENT BRINGS OUT MEAT FLAVOR — Adding no flavor, color or aroma of its own, Ac'cent heightens, to an amazing degree, the good, natural flavors already in meats and most other foods. Equally important — it holds those wonderful flavors . . . helps combat flavor-loss in processing. For Ac'cent, long used as a basic seasoning by chefs and gourmets, is monosodium glutamate in its purest form—99% pure, wholesome crystals derived from vegetable sources.

Test Ac'cent yourself . . . in your own plant . . . with your own products. Our technologists are prepared to demonstrate, convincingly, how Ac'cent can make *your* food flavors sing! Write today for information: Amino Products Division, International Minerals & Chemical Corp., 20 North Wacker Dr., Chicago 6, Ill.

Ac'cent®
PURE MONOSODIUM GLUTAMATE

Makes food flavors Sing

These are the "VAPOR-VACUUM" CARS

...Just 4 simple designs among hundreds—yet they take care of a huge portion of the nation's glass pack!

Of closure designs and styles for food packaging, there's no end! The total number now on the market runs into the hundreds.

Yet, in all this profusion and confusion of design, just one type of seal, *with 4 simple variants*, accounts for an amazing proportion of the entire food industry's glass packs.

In many major commodities, *just one* of the 4 primary Vapor-Vacuum designs takes care of nearly all the packaging of known brands.

It is well worth noting, therefore, that the huge preponderance of Vapor-Vacuum Sealing has been built on *simplicity*, rather than *multiplicity* of design. Despite the wide range of the food industry's needs, Vapor-Vacuum has always striven to simplify the closure situation—by developing basic designs that would take care of multiple needs.

The success of this long-standing policy is amply evidenced by the fact that *only* one basic design, with 4 simple variations, today makes up nearly all of the Vapor-Vacuum's vast volume:

1. The Standard Whitecap. This is the basic Vapor-Vacuum design, the medium depth side-seal cap which converted so great a portion of the food industry to Vapor-Vacuum Sealing. By providing perfect sealing —at any required speed—and at any subsequent processing temperatures, the Whitecap has revolutionized closure standards.

2. The Shallow Side-Seal. This is the Vapor-Vacuum cap for beaded or straight wall tumblers. It provides the same general performance as the standard Whitecap, but utilizes hook-opening instead of pry-off. *Its high flexibility defeats hook-opener damage*, because it lets the user re-form any distorted cap by easy finger pressure.

3. The Wide-Mouth Slip-On. For the very utmost convenience on mayonnaise, preserves, pickles, and peanut butter! Offers the same easy off-and-on action as the catsup cap—the same one-hand re-opening and closing. Gives your package distinctly different sales appeal and *personality plus!*

4. The Narrow Slip-On. This is the Vapor-Vacuum closure which caps nearly all catsup and chili sauce. Slip it back on the bottle, without pressure, and it holds firmly. Or, with a bit of pressure, it re-seals hermetically.

"VAPOR-VACUUM" Seal and Re-Seal

PRODUCT OF WHITE CAP CO., CHICAGO

Use Stainless Tubing and Pipe?

Call Ryerson for Quick Shipment

The country's largest stocks of stainless tubing and pipe await your call at Ryerson. On hand for immediate delivery are nineteen distinct kinds—both seamless and welded—in a wide range of sizes. Our stocks also include stainless pipe fittings and fastenings for every requirement.

The stainless tubing and pipe you get from Ryerson is of highest quality and meets the exacting requirements of ASTM Specs. You can count on its size accuracy and scale-free finish. You can form and weld it readily, thread it accurately. And when you call Ryerson, America's pioneer warehouse distributor of stainless, you put 25 years of practical stainless experience to work for you.

Ryerson protects the high quality of all stainless tubing and pipe stocks by expert handling. Our facilities include modern equipment to cut your stainless exactly to order and deliver it promptly. So, for complete stainless service, call your nearby Ryerson Plant.

STAINLESS TUBING AND PIPE IN STOCK

TP304 TUBING....Seamless & Welded
TP316 TUBING....Welded
TP304 PIPE.....Schedule 5—Light Wall—Welded
Schedule 10—Light Wall—Seamless & Welded
Schedule 40—Standard Weight—Seamless & Welded
Schedule 80—Extra Heavy Weight—Seamless
TP316 PIPE.....Schedule 5—Light Wall—Welded
Schedule 10—Light Wall—Welded
Schedule 40—Standard Weight—Seamless & Welded
TP347 PIPE.....Schedule 5—Light Wall—Welded
Schedule 10—Light Wall—Seamless & Welded
Schedule 40—Standard Weight—Seamless & Welded
Schedule 80—Extra Heavy Weight—Seamless

STAINLESS FITTINGS & FASTENINGS—Screwed and welding pipe fittings, welding spuds, valves, bolts, screws, washers, etc.
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RYERSON STEEL

NOVEMBER, 1950

Food Industries

Don't Overlook Your Long-Range Planning

What will be the business potential in your industry 10 years from now? What factors will determine that potential? And what must you do merely to maintain your position in the industry?

Answers to these questions are highly important to the future of a manufacturing operation, regardless of current uncertainties involved in our defense program. But few business and technical men look that far ahead. Still fewer do realistic long-term planning. Most men in industry are engrossed in the outlook for the next six months, or year.

While the importance of short-term planning to avoid pitfalls cannot be over-estimated, it is not enough in itself. It leaves you blind to the opportunities inherent in the industrial and economic growth of this dynamic country.

Here is what we mean: For 1960, total national output of goods and services in the United States is placed at $315 billion—up 18 percent—by McGraw-Hill economists. Population 10 years hence is put at 165 to 170 million—up 10+ percent. The employment figure is 65.5 million—up 5 million; business capital expenditures, close to $25 billion, compared to about $20 billion in 1950.

Consumer expenditures are estimated at $220 billion, against $185 billion this year. The increase in productivity is taken at the historical average of 1.7 percent per year. Average weekly working hours are estimated at 38. And if wages go up 3 percent per year, with a productivity plus of 1.7 percent, wholesale prices can easily rise 1 percent per year.

Now add to these figures the BAE estimate that Americans will be eating 5 percent more food per capita in 1960. Then allow for population growth, and you see a food consumption increase of 15 percent.

So there are some basic evaluations upon which to begin your long-term planning. Obviously, you have to raise your eyes when you look ten years ahead. It has long been thus in this country. Even if you take the period from 1930 to 1939—with its deep, dark, and long depression—you find that the overall trend was upward.

In long-term trend projections, you necessarily establish the end point on the curve, say at 1960, and draw a straight line from the current level to the estimated future level. Then you figure out what you must do in your business or department to gear operations to that eventual level, taking into consideration what you can afford to do on the basis of the rise in business.

But here is where the caution sign should be waved. No point at any date along the long-term trend line has any validity. There will be upturns and downturns along the way, and no one has the temerity to predict just when these will occur.

The straight-line trend is but an average. So you use short-term studies to foresee the peaks and valleys immediately ahead. Not only is this vital in planning operations a few months hence, but it tells you when you may safely make the new commitments involved in gearing an operation to the long-term level.

After you set the long-term goal, then you really get into the interesting and rewarding phases of your planning. Piece by piece you set the course for each element in your business operations: Expansion, modernization, new plant locations, research programs and budgets, new product and package development, employee and public relations, raw material supplies and marketing.

You have to consider such things as population and market shifts, changes in the ratio of young and old in the total population, trends in consumer eating habits, cost and price movements, and the efficiency required for suitable profits.

It is a most interesting assignment. And it cannot help but pay dividends, even if your long-term sights are not accurately set. The very act of evaluating the future and the factors involved will enable you to do more currently in your business and in your job.

Naturally, the ambitious business man will not be satisfied with a long-term future established merely by following the trend of events. He will want to do better. So he will add to his trend plans the plus values needed to grow faster than the average.

It's time to start shooting at '60. And our guess is that the defense program acceleration of industrial production will make '60 even bigger than it looks today.

—F. K. LAWLER, *Editor*

ROY KAMMERMAN

In cooperation with American Institute of Accountants, national professional society of Certified Public Accountants

The Shears Make . . .

Lower Your Taxes

Here are a number of practical

Last year you probably paid more taxes than necessary. Or to look at it from a more encouraging angle, proper advance planning and sound accounting methods can reduce your tax liability this year.

There are countless occasions where a transaction in one form will be taxed lower than one which achieves the same result in a slightly different manner. Indeed, taxes are now so major a cost of doing business that the time and form of a transaction, as they affect taxes, are often even more important than negotiating for the right price.

That is why food processors—along with businessmen everywhere—are now studying taxes as they would any other cost. The trend today is to consider the tax effects of all business transactions *before* going ahead.

An example of the choices confronting food processors at every turn is seen in even so routine a matter as the purchase of new equipment.

A southern packer decided to replace a canning machine. He had taken annual depreciation on the machine, and its current value on his books was $7,000. However, the equipment company would allow him only $4,000 for it on a trade-in.

He was about to trade in the old machine—but after considering the tax results of such a deal, decided against it.

Instead, he made two separate transactions of the deal: He sold the old machine to the equipment company, then used the cash to help buy the new machine from the same company.

By selling the machine for less than its depreciated value, the packer sustained a book loss of $3,000. But he was able to deduct this full $3,000 from taxable income.

If he had traded in the machine, he would not have been allowed to claim the loss, since the tax law states no gain or loss is deemed to have resulted from a trade-in.

If the packer had been offered $3,000 more than the depreciated value of the canning machine, perhaps he would have been wiser to trade it in, rather than sell, since the $3,000 book profit would not be taxable.

Good Accounting Essential

Simply knowing the tax alternatives is not enough. Your accounting system must indicate which alternative is right for your own company.

Suppose you are buying a new machine for $12,000. Your old machine is on the books at a depreciated value of $3,000, but your dealer will allow you $5,000 for it.

If you trade in the old machine, your $2,000 profit will not be taxed. However, the value of the new machine for depreciation purposes will be less than if you had sold the old machine and bought a new one without a trade-in. This is because the price of a new machine bought on a trade-in is figured, for tax purposes, to be the depreciated value of the old machine (not its trade-in allowance) plus the balance of the purchase price. In this case, it would be $3,000 plus $7,000, a total of $10,000.

Now, if the machine were bought without a trade-in, its value for depreciation purposes would be the full $12,000 price.

The decision to trade or not to trade will depend upon the financial circumstances of your company as revealed by its accounting system.

It is obvious, then, that two kinds of knowledge are needed: You must know the tax alternatives. Then you must know which is best for your business.

On the accounting front, the best assistance available is that of the certified public accountant. He has passed difficult State tests in experience and skill necessary to help you with your accounting problems. Acquire the good habit of getting him to help you. When legal problems are involved, you will, of course, need the advice of a lawyer. Getting the best tax advice always pays.

Remember the government does not want you to pay more than you should, but the responsibility for keeping your taxes at their legal minimum rests on yourself.

In the Public Interest

You do neither the government nor yourself a service when you fail to conduct your business with maximum tax economy. For such failure means you are placing a strain upon your ability to pay—and ultimately upon the whole tax structure. It is in the public interest that your business be healthy, that it continue to function at a profit.

The following cases, while they do not constitute a tax guide, show how advance planning can save tax dollars. The cases were selected for the simplicity of principles involved. Usually dozens of more-complex problems warrant the attention of management throughout the year. The principles cited should aid in the approach.

Do not attempt to *detail* your own program of tax economy on these basic examples. Slight variations in your transactions, although they may seem unimportant

. . . All the Difference

The *Accounting* Way

examples showing how to do it

to the layman, might completely alter your tax status. You should have professional advice.

Are Repairs Always Repairs?

A Western canner, Jones, decided to use some of his postwar profits to make extensive changes in his plant. He wanted to: Repair bad spots in roof, replace coal furnace with oil, relocate steam pipes, install modern electrical wiring system, mend broken plaster, paint walls and ceilings, build new shelves, and remodel offices. The contractor's estimate was $16,000.

Jones believed he could deduct the entire amount from taxable income under the heading of "repairs." Before signing the contract, however, he checked up on the facts. He was well rewarded for his alertness. If he had gone ahead as planned, he would have lost a deduction of $7,000!

Granted, cost of repairs is deductible. But cost of improvements isn't—you are permitted simply to take annual depreciation on improvements. What's more, if repairs are made as part of a general improvement plan, or if separate records of repairs are not kept, they are considered to be improvements and are not deductible.

The canner's first job was to decide which, exactly, were improvements and which were repairs. The Treasury Department considers "repairs" to be steps necessary to keep property in reasonable shape without adding appreciably to its value. In this case, the Treasury accepted the following as repairs: Mending the bad spots on the roof, relocating steam pipes, repairing the broken plaster, and painting the walls and ceilings. All other items were considered improvements.

Two separate contracts were then drawn up, one for repairs and one for improvements. The repairs amounted to $7,000, and Jones was able to deduct this full amount on his tax return.

If the repairs had been considered improvements, Jones would have missed the immediate tax saving which most concerns prefer to take, but he would have been able to depreciate a portion of the cost each year over the life of the alterations.

The tax rule governing repairs and improvements holds true with the repair and improvement of all food processing machinery.

Dependents in the Business

If any dependents work regularly in your business, plan their compensation to your greatest tax advantage. The 16-year-old son of a small Great Lakes packer worked in his father's plant during the summer vacations. Before setting his son's wages, his father drafted a plan, then proceeded as follows:

He paid the boy approximately what he would have paid any other employee for similar work, but was careful to keep the yearly total of his son's wages under $500. He withheld income tax on these wages, and the son had to file a return in order to recover the payments. However, the son did not have to pay any tax on these wages since he had no other income.

The father deducted the son's wages as a necessary business expense. Then, since he had paid the son less than $500, he was able to list him as a dependent on his personal return and deduct $600 for him.

Casualty Insurance

If you ever suffer a loss that's covered by insurance—for instance, a fire, or any other casualty—be sure to consider the tax effect of replacing the loss. It may save you a good sum.

A cannery in New England was completely destroyed by fire. It was insured for $150,000. Rebuilding would cost about $150,000. Instead of rebuilding, the packer decided to buy a suitable building in the same city, which also cost $150,000.

Payment of the insurance was delayed by a technicality. The packing company, however, decided to buy the building immediately, financing the purchase with a bank loan to be paid when the insurance was paid.

■ "You do neither the government nor yourself a service when you fail to conduct your business with maximum tax economy. For such failure means you are placing a strain upon your ability to pay—and ultimately upon the whole tax structure. It is in the public interest that your business be healthy, that it continue to function at a profit."

The deal was ready to be consummated when the president asked that the tax status of the whole proceedings be investigated first. His vigilance saved the company about $18,000 in actual taxes.

The tax liability would have come about in this way: The old building had been depreciated until, at the time of the fire, its value on the books was $75,000. Therefore the $150,000 insurance represented a gain on the books of $75,000 over the depreciated value of the building.

If the company purchased the new building before receiving the insurance, it would pay taxes on the full $75,000 gain—not less than $18,750.

These taxes would have been payable even though the insurance merely covered the replacement and no actual gain resulted.

The same rule applies to all insured casualties. To avoid a taxable gain, you must purchase the replacement after—never before—you receive the insurance. And it is usually a good idea to put the insurance money in a separate bank account, so that you can definitely trace it to the payments for the new property.

Inventory Accounting

Proper computation of inventory may save a food processor thousands of dollars in taxes every year. You are offered several alternates in computing your inventory. The subject is far too complex to even hazard an illustration here, for it might be misleading. You might ask your accountant about two of the inventory systems—LIFO (Last In, First Out) and FIFO (First In, First Out).

Depreciation

Like inventory, depreciation is a complicated accounting problem. In a word, it can be said that getting the maximum depreciation credit depends largely upon proper records. Average lives of from 15 to 17 years are considered reasonable for the machinery of canneries engaged in canning fruits and vegetables. But individual records of large pieces of equipment should be kept. If, for instance, your plant works consistently on a 24-hr. basis, you may be able to claim accelerated depreciation on some equipment.

The first step in determining depreciation is to fix the cost of the asset. But is the cost of the asset what you paid for it? Not necessarily. It may be cost plus freight, plus installation, plus improvements, plus carrying charges —plus whatever other costs are allowed.

If, for instance, you install canning machinery in a building which you do not own, you may take depreciation on the cost of the installation over the period of your lease, while the machinery, itself, is subject to a different depreciation.

The government publishes depreciation rates for new machines. It does not however, list such rates for second-hand machines. Your regular accountant can determine a rate of depreciation on second-hand equipment on a basis acceptable to the Treasury and fair to you. Also, government published rates are based on average circumstances. Your CPA can tell you from his experience whether in your specific case higher depreciation rates would be allowable.

Record Keeping

Tax economy is directly dependent upon records. Without records, you risk higher taxes. The Treasury has court precedent to "bear down heavily on those whose inexactitude (failure to prove exact costs) is of their own making."

A good accounting system installed by a CPA will help you to keep not only your taxes, but your other costs under closer supervision. If you are in doubt about your present bookkeeping system, it will pay to have a CPA set up a new one.

When Profits Are Large

You can ship merchandise "on approval" or "subject to acceptance," with no gain realized until approval or acceptance is indicated. For merchandise shipped on consignment is deemed to have resulted in no gain to the shipper until it is paid for. Shipping of goods under these conditions may serve to defer income from a high tax period to a later, more economical, period.

If your business is on the accrual basis when you bill a man for goods, you report as income the full amount of the bill. The 2 percent cash discount often given is not deductible from your taxable income until the net amount of the bill has been paid. In a case where you might want to reduce current tax liability, you could provide for trade discounts, or price reductions, instead of the 2 percent cash discount. In this manner, your billing would reflect the equivalent of the cash discount at once, and you would thus realize an immediate tax saving.

In a year when your taxes are mounting high because of large profits, you may be able to minimize the taxes by the following methods:

If you are paying for equipment no longer needed, you might return it and take the loss in a high tax year.

Launching a new product? If possible, do it now so that the first months, when it may show a loss, come in a year when taxes are high.

In a high tax year, spend money on operations that will help you to promote more profit the next year, but which will be deductible this year.

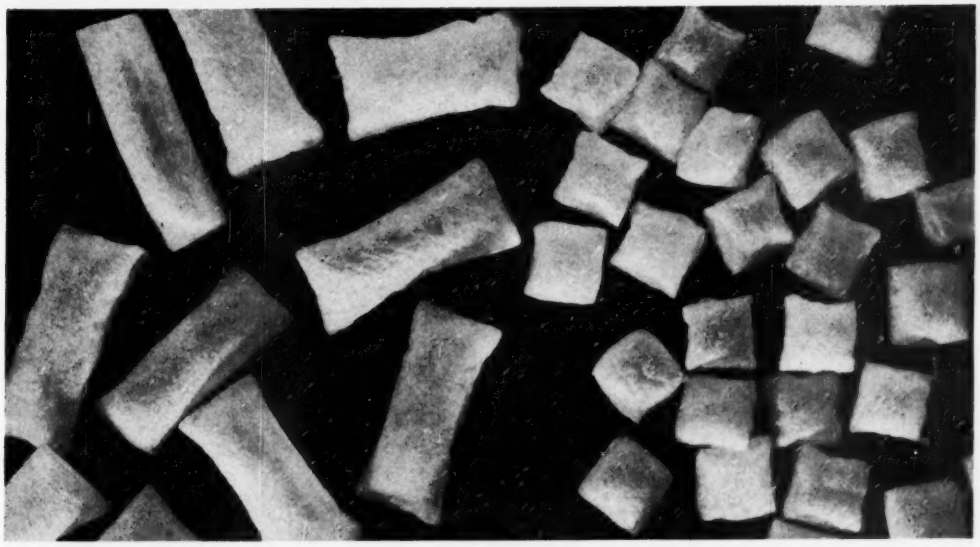
Settle bad debts in your high tax period. If only part of a debt is bad, you may be able to write that part off.

Some Tips on Tax Cutting

When You're—

Replacing a machine	**check on whether to trade in or whether to first sell the old unit, then buy the new one.**
Making repairs or improvements	**carefully determine which are repairs, which improvements. Former are deductible, latter aren't.**
About to collect casualty insurance	**don't purchase replacement until after you get insurance check.**
Working with large inventories	**ask your CPA which of several complex methods of computation will give best tax advantage.**
Operating on 24-hr. basis	**you may be able to claim accelerated depreciation on some equipment.**
Now making larger profits	**there are many ways to defer income to a later, more economical, period.**
Hiring a dependent temporarily	**you lose your $600 personal exemption if he earns more than $500 yearly.**

New Feather-Light Tidbits—Long and Short Varieties



THE PUFFS have plenty of "snack appeal." Large: ⅝x1 in.; small: ⅝x⅜ in.; thicknesses of both ⅛ in.

WRRL "Puffs" Potatoes

Crunchy, oil-free product seen as promising market item. Variety of flavors can be easily added

W. O. HARRINGTON and F. P. GRIFFITHS
Western Regional Research Laboratory, Bureau of Agricultural & Industrial Chemistry, Agricultural Research Administration, USDA, Albany, Calif.

Researchers at WRRL have come up with an oil-free, pillow-shaped puffed potato tidbit that can be flavored and has an attractive crunchy texture and toasted color.

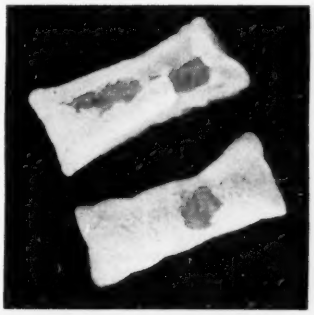
■ **Consumption possibilities: For out-of-hand eating, as a breakfast food, and in soups, stuffing and casserole dishes.**

Storage testing has shown that the "puffs" are sufficiently stable for commercial distribution. But so far no studies on processing equipment and costs have been made. Application is in, however, for grant of a public-service patent.

The laboratory's general objective is to find new commercial uses for white potatoes, to help not only the grower but also the food processor and consumer. This particular research on puffs had its origin during wartime dehydration studies, when it was observed that diced potatoes puff up under certain drying conditions.

First, potatoes are peeled, trimmed and cut into strips ⅛ in. thick, generally ¾ in. wide and from ⅜ to 1 in. long. These are blanched in boiling water for 15 sec. to 1 min.

Then the small cuts of potato are turned into the rounded, browned, crisp, hollow puffs—by rapid drying of the surface, at the same time heating so that steam forms internally, expanding the piece.



HOW INTERNAL STEAM blows up potato pieces is shown in these samples of broken puffs.

The drying and puffing is in a vertical hot air stream moving at least 2,000 fpm. Time required for puffing varies inversely with air temperature. For example, 6-7 min. at 320 deg. F.; 10 min. at 265 deg. F.; and 13 min. at 250 deg. F.

The rapid air stream is necessary to insure uniform drying and to agitate the non-puffed piece, helping to prevent sticking to sides of drying chamber. However, the latter difficulty is perhaps better overcome by coating the metal with silicone compounds (same procedure that some bakers use to prevent bread sticking to pans).

Then, after puffing is complete and pieces have dried enough to retain their shape, the temperature and velocity of air are reduced to prevent excessive browning and breakage. Drying is continued to reach a desirable moisture content of 5 percent, either in the agitation chamber or in a tunnel dryer. Chamber requires about ½ hr., tunnel somewhat longer.

Wrinkling or collapsing of puffs may occur in the second drying stage if the pieces cool too fast or surfaces are softened by residual moisture.

Can Put in Different Flavorings

Consumer acceptance of the puffs may be enhanced by addition of flavors. Agents such as cheese, garlic, onion,

(*Turn to page* 178)

INSPECTOR points to lymph gland in hog carcass. Congestion here positively indicates internal bruises in ham.

Packer Comes Up With 7 Better Practices

Puts new efficiency in technics all along processing line—revamps marketing, fuel handling, too. Result: Quality raised and man-hours saved

FI STAFF

Smart revisions in its food-plant practices have put higher efficiency into pork-packing operations at the plant of Tobin Packing Co., Inc., Rochester, N. Y. And these innovations have brought notable improvements in quality control.

Seven developments in this modern plant stand out for novelty and efficiency: (1) An accurate and simple method of detecting internal ham bruises, (2) a new system making for more uniform chilling of hog carcasses, (3) multiple use of the pork-cutting line for boning and trimming meats in addition to preparing the conventional cuts from carcasses, (4) an ingenious device for precisely controlling the amount of curing solution injected into hams, and (5) a rapid way of wrapping a wide variety of sausage products.

And in addition, the company has also devised (6) a more effective means of bringing its pork products to market, through use of three different types of trucks. And (7) it has installed a completely mechanized coal unloading system—stoker equipment, too—for notable plant savings.

Spotting Internal Ham Bruises

First novel technic—detection of internal bruises in hams—was discovered by two employees in the pork-cutting department. Up until then the meat-packing industry had no practical, sure-fire way of spotting such bruises. Only way to do it was to cut a suspected ham. But this meant that the cut ham then had to be processed into a boiled instead of a smoked product, even when it did not have an internal bruise.

These bruises are now easily and quickly detected by examining a lymph gland—the internal illiac—for evidence of inflammation or congestion. If this gland, which is located at the interior juncture of the ham and the pork loin, is blood-red throughout instead of white, then the ham is bruised internally.

Since adopting this simple method of detecting internal bruises in hams, customer complaints have been eliminated. What's more, sale of smoked hams has increased markedly because the customer is now assured of a bruise-free product.

Installation of the finned-coil system of refrigeration in the carcass cooler was the second change that increased plant efficiency. Since the finned coils were put into operation, carcasses are now uniformly chilled. Also, the surface of the meat shows no evidence of drying out due to improper humidity conditions. Moreover, defrosting of these coils has been simplified

These Technics Have Improved Pork-Packing Operations

UNIFORM CHILLING of hog carcasses has been attained with the fin-coil system of refrigeration (top).

SIMPLE CHANGES enable packer to broaden use of pork cutting line for boning and trimming meat cuts.

SPEEDY twist-wrapping of smoked butts—900 pieces per hr.— is another of Tobin's efficient developments.

SECOND packaging line is used for a variety of products. Here, trayed frankfurters are being wrapped.

NEW insulated and refrigerated 6-wheeler. Its appetizing pictures of products serve as "rolling billboard."

COMPLETELY automatic coal-unloading system saves time and labor. Its use has eliminated demurrage costs.

through the use of metal troughs below the fins.

Uniform chilling of hog carcasses means faster and easier cutting on the pork line. This makes for increased production and more uniform cuts—hams, loins, butts, picnics, and bellies—in accurate yields.

Trouble with the former system of chilling the carcasses was the actual freezing of some portions of the animals and lack of proper refrigeration of other portions. Carcasses chilled too much are difficult to cut, over-chilled hams are not easy to artery-cure.

3-in-1 Conveyor Line

Third step to new efficiency on the pork-cutting line comprised several simple modifications so that the line could quickly be used for boning and trimming meats. Removable-type wooden cutting boards were built into both sides of the conveyor line, alongside the belt. And provisions were made for quick and easy raising or lowering of the two cast-iron belly rollers above the belt.

All told, these two simple alterations brought a notable advantage and a double saving:

Three operations—boning and trimming meats, as well as cutting up carcasses—are now carried out. Formerly, this line was only used during the morning shift to break down the carcasses into the different pork cuts, and the cutting line remained idle during the afternoon. Now it is employed as a boning and trimming line during the afternoon.

These simple modifications have brought about savings both in equipment and space. The company did not have to purchase additional conveyors for boning and trimming lines. And floor space that would have been taken up by these additional lines was thus released for other departments.

Improved Artery Curing

An accurate method of pumping curing solution into hams is the fourth change contributing to the new efficiency.

Originally, quick curing of hams was accomplished by the use of a solution—salt, sugar, and sodium nitrate or nitrite—which was forced into the tissue of the meat by pumping it into the large artery. The amount of solution injected into the ham was measured by a flow meter. The chief trouble with this method, however, was the inability of the workers to compensate for the curing solution that did not flow into the artery but spilled on the pumping table.

Now, a mechanical means of subtracting the amount of cure that does not go into the ham has been invented and patented by H. Rumsey, Jr., vice-president of the company.

Here is how the new controlled cure-pumping system works:

First, the ham is weighed to determine the amount of curing solution required. Then, an injecting needle, with a trigger-controlled grip, is attached to a rubber hose that is in turn connected to a pump for delivering the curing solution from a tank. This needle is inserted into the large artery, and the cure is fed into the ham by pressing the trigger. As the solution flows into the ham, some of the cure spills onto the stainless steel pumping table. This spilled cure then drains into one corner of the sloped table, where it flows into a 3-in. dia. vertical cylinder. Here, a float, connected to the flow meter dial, rises as the amount of solution in the cylinder increases. And this rising float rotates the meter dial clockwise, thus correcting for spillage to assure an accurate amount of curing solution in the ham. Meanwhile, the pointer on the flow meter travels in the same direction to indicate when the exact amount of cure has been pumped into the ham.

After the proper amount of cure has been pumped, a gate valve is opened to flush the waste solution from the cylinder. Then, the valve is closed (so the cylinder is again ready to catch curing solution during the next ham-pumping operation) and the dial is reset to zero.

Snug-Fit Wrapping

Fifth change—development of the new Moldart wrapping technic—is another invention of H. Rumsey, Jr.

Up until the time this ingenious wrapping technic was devised, the job of packaging irregularly shaped smoked butts was a major problem. The excessive amount of labor required to string-tie the ends of transparent film wrapped around each butt was one of the difficulties. Another was the inability to fit the wrapper snugly over the product.

Answer was the installation of two Moldart-wrapping lines—one for smoked butts or shoulders and the other for packaging a variety of other pork products in bulk or self-service units.

Each line consists of an 18-in. wide rubber belt conveyor that carries the meats past the weighing, wrapping, twisting, and packing stations. Each wrap machine is equipped with a roll of cellophane or Pliofilm. The film is fed through a set of rolls and then cut into sheets of the proper size by a manually-operated sliding knife. Since cellophane is not so elastic as Pliofilm, water is spread on the sheet as it goes through the rolls. The water causes the cellophane to stretch and conform to the shape of the meat, which is then hand-wrapped and put on the conveyor that takes it to the Moldart twisting machine.

This unit has a 3-in.-wide belt that turns to make the twist as the operator presses the meat on the belt, holding both ends of the wrapper. The twisting action assures a tight seal of both ends of the wrapper and close adherence between film and product.

With this new speed-wrapping system, four major improvements were noted:

1. Packaging line output more than tripled immediately. Some 900 pieces of smoked butts are now turned out in the time formerly required for about 250 pieces.

2. With the installation of twisting machines to spin the ends of the wrapper in pig-tail fashion, the tedious string-tying of the ends had been eliminated.

3. The same machine—the twister—also assures close adherence between the wrapper and the butt. The "glove-tight" wrap is neater looking. Moreover, because of protective close adherence of film to wrapper, shelf-life of the product is considerably extended.

4. Use of the Moldart-wrapping line, as stated, has not been limited to packaging smoked butts. It also "doubles" for smoked pork shoulders. And now the new method is being satisfactorily used to wrap a wide variety of products. Among them are 1-lb. packages of skinless and cocktail frankfurters, cut pieces (bologna, Thuringer, and liver sausage), and bulk products (baked loaves and smoked tongue).

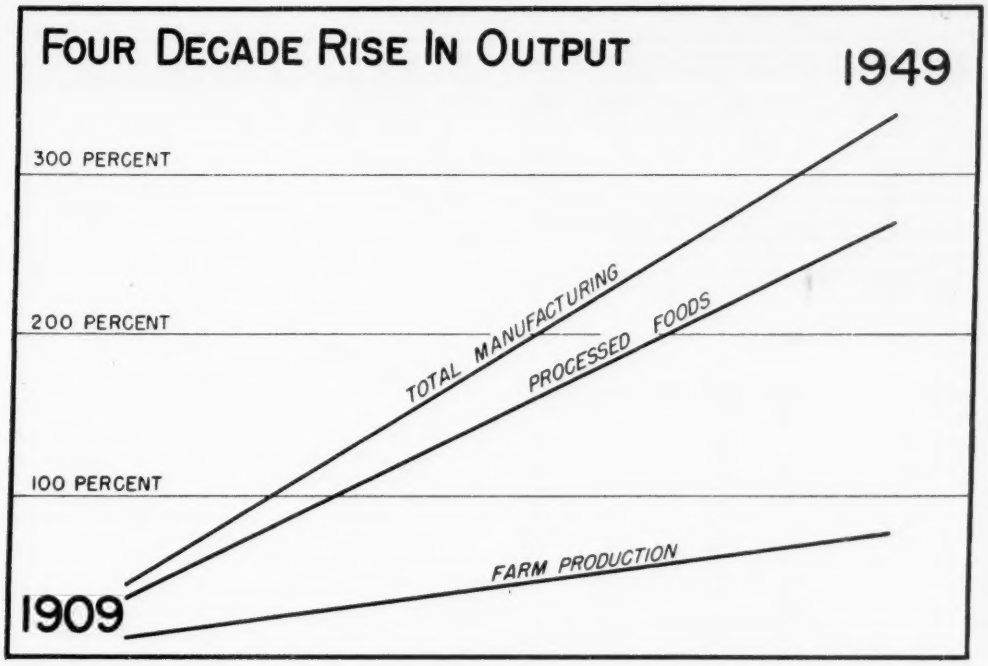
The Moldart line for packaging butts and shoulders comprises one twisting and two wrapping machines. Six workers are required here. One removes stockinettes from the products, another feeds the butts or shoulders onto a rubber-belt conveyor, two wrap them in amber-colored cellophane, one twists the ends of the wrapper, and another weighs each package and packs it into a carton.

Production on this line in an 8-hr. shift is about 9,000 butts or 8,000 shoulders.

The second line is equipped with one twisting and three wrapping machines for packaging the remaining products previously listed, in Pliofilm. In addition to conventional one-product wrapping, this line is also used to package three different products at once. For example, frankfurters, link sausages, and baked loaves can be wrapped simultaneously.

Total number of workers needed on this line depends upon the products

(*Turn to page* 176)



Food Processing Marks

40 YEARS OF GROWTH

A striking 268-percent climb in production of manufactured foods has been chalked up in the last four heavy expansion decades . . . Increase in future years seen much more moderate

ALLEN B. PAUL

Assistant Professor, Department of Food Technology, University of Illinois, Urbana

The United States output of manufactured foods has increased 268 percent since 1909. In comparison, food production at the farm level increased 76 percent and total manufacturing increased 334 percent.

In terms of the average annual rate of growth for the 40 yr. period, food manufacturers increased 3.4 percent per year, farm foods 1.5 percent, and total manufactures 3.7 percent. Thus food manufactures kept pace with total manufactures surprisingly well.

On the other hand, food manufactures behaved more like farm food production than total manufactures with respect to the stability of growth. Deviations from trend values averaged 18.8 index points for food manufactures, 8.5 index points for farm food production, and 60.9 index points for total manufactures, 1921-47 (see Fig. 1).

What are the reasons for the relatively rapid and stable growth pattern of food manufactures? For one thing, food manufacturing is a hybrid, combining the characteristics of manufacturing that permit quick growth, with the characteristics of food that result in stable growth. The instability of manufactures and the slow growth of raw foods prove to be recessive traits.

Characteristically, the consumption of most manufactured goods is postponed, or at least reduced, when incomes decline. But also there appear to be no known limits, other than income, to the amount of manufacturing services that might be demanded by the people. These economic traits result in a fast but highly unstable growth pattern of manufactures.

On the other hand, farm food production tends to be relatively constant because food is a constant physiological need. But there are limits to growth relative to the amount of food that might be profitably produced, for the same reason. Production for export was primarily a phenom-

Here Are Primary Data That Trace the Expansion

TABLE I—Approximate Shares of Specified Processing Activities That Were Carried Out in Factories

	Percent 1909	Percent 1929	Percent 1939	Percen 1947
Baking[a]	22	41	43	58
Butter making[b]	39	75	81	80
Livestock slaughter[b]	64	80	78	76
Canning fruits and vegetables[c]	..	59	--	73

[a]As measured by percentage of U. S. flour consumption used by commercia baking industry. The 1909-1939 estimates are from G. Stigler, *Trends in Output and Employment;* the 1947 estimate was made by author from data in 1947 Census of Manufactures (possibly it is somewhat low).

[b]Based on data in *Agricultural Statistics.*

[c]Based on author's estimates of volume of home canning of fruits and vegetables and USDA estimates of total domestic consumption of commercially canned fruits and vegetables.

TABLE II—U. S. Foreign Trade in Manufactured Foodstuffs[a]

Year	Value (million dollars) Imports	Value (million dollars) Exports	Physical volume (1913-100) Imports	Physical volume (1913-100) Exports
1909	166	303	...	...
1913	194	321	100	100
1919	556	1,963	...	250
1921	368	685	100	156
1923	530	583	122	147
1925	433	574	160	121
1927	451	463	150	111
1929	423	484	185	119
1931	222	247	131	85
1933	201	155	138	67
1935	319	157	185	51
1937	440	178	232	53
1939	313	202	195	75
1940	277	167	179	60
1941	322	418	189	127
1942	275	925	120	205
1943	421	1,851	172	324
1944	521	1,633	208[b]	300[b]
1945	462	1,246	174[b]	233[b]
1946	...	...	165[b]	260[b]

[a]Source: *Statistical Abstract of the United States, 1947,* and earlier issues.
[b]Preliminary.

Table III—Production Indexes of Manufactured Foods and Related Categories, U. S. (1909 = 100)

Year	Total U. S. production: All foods[a]	Total U. S. production: Manufactured foods[b]	Total U. S. production: All manufactures[c]	Per capita production[d]: Total food (farm level)	Per capita production[d]: Manufactured foods
1909	100	100	100	100	100
1914	107	120	119	98	110
1919	118	147	140	102	127
1921	110	145	126	92	121
1923	125	180	178	101	146
1925	122	193	190	96	151
1927	128	202	202	97	154
1929	128	225	231	95	168
1931	132	205	167	96	150
1933	128	185	145	92	134
1935	122	208	190	87	142
1937	133	235	238	102	166
1939	139	250	238	96	174
1940	146	262	274	100	180
1941	151	295	367	103	200
1942	166	310	464	111	209
1943	176	335	565	117	222
1944	184	352	548	121	232
1945	183	348	466	119	226
1946	184	345	386	118	221
1947	184	362	424	116	228
1948	176	368	434	109	228

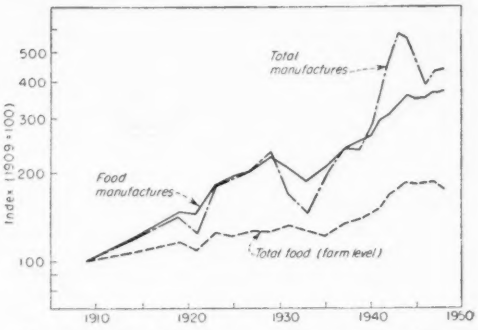
[a]Total volume of agricultural food production for sale and for farm-home consumption, USDA Misc. Pub. 691, (mimeo) p. 16.

[b]National Bureau of Economic Research index of manufactured foods, 1909-1939; Fabricant, *Output of Manufacturing Industries,* and Federal Reserve Board index match former closely in overlapping years, 1935 and 1937.

[c]Same sources as in preceding footnote.

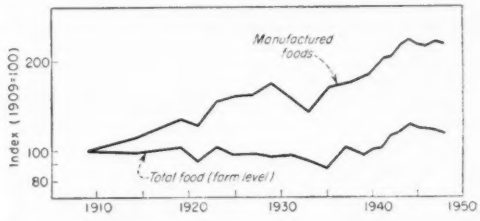
[d]Production indexes divided by an index of total population, July 1, the latter given in USDA Misc. Pub. 961, p. 135.

FIG. 1—Indexes of Food Production at the Farm Level, Food Manufactures, and Total Manufactures, United States, 1909-1948.



The pattern of relationships reveals how food manufacturing paralleled total production during the 20's, but in the 40's it ran closer to farm output. A transitional relationship was evident in the 30's. It is to be noted that the only data available for this chart were for the odd-number years.

FIG. 2—Per Capita Production of Foods at Farm Level and Manufactured Foods, United States, 1909-1948



enon of the war periods and the early developmental phases of the economy. Hence these economic traits result in the slow but stable growth pattern of farm food production.

The output of food manufactures is defined by the amount of manufacturing services attached to each unit of food, and by the number of units so processed. Since some processing services can be dispensed with, food manufacturing output is more sensitive to changes in income than is output of foods at the farm level. Yet many such services are not relinquished as readily as services in the nonfood manufacturing sectors.

It may be true that many people prefer the consumption of processing services to the consumption of some types of food nutrients. There are, in fact, few physiological restrictions on the amount of processing services per unit of food that might be demanded by consumers, hence the food manufacturing industry is capable of large growth. For example, the increased consumption of flour-mixes increased food processing activity with no proportionate increase in consumption of the ingredients.

Other examples involve baby foods, quick frozen foods, dehydrated foods, and canned meats. Similarly, advances in container design increase the manufacturing services primarily. Perhaps as important as any are the innumerable refinements in processing technics to improve given products, adding to manufacturing operations only. People spend money to obtain such services.

Transfer of Operations

A second reason for the growth of food manufactures is the transference of processing activities from farms, households, and distributive agencies to factories. Many housewives do less home canning, baking, soup preparation, and the like than formerly. The household and farm manufacture of wines, cider, mayonnaise, candy, cured meats and butter has declined. So has the farm

and retail slaughter of livestock and poultry. Similarly the grocer's packaging of foods from bulk stocks has given way to the more complicated factory packaging operations. How important are transferred operations as a source of growth?

It is difficult to measure this transference, but light can be shed on its probable magnitude. Some of the greatest transfers have occurred in baking, butter making, canning, and livestock slaughter. We have data to show the changes in the relation of factory output to total output in selected years (see Table I).

An estimated 36 percent of the United States flour consumption was transferred to bakery establishments, 1909 to 1947. Similarly, 41 percent of the butter output and 12 percent of the livestock slaughter were transferred to factories. In the latter case, transference was at a higher level in 1929 and 1939 than in 1947.

This reversal since 1929 was probably due to the increase of farm and retail slaughter during the depressed '30's and the tremendous growth of retail locker plants and home freezer units during the recent '40's.

Only rough estimates of transference of canning can be made. Factory output accounted for 14 percent more of the domestic consumption in 1947 than in 1929. The shift from 1909 to 1929 cannot be measured, but it probably was greater than 14 percent. If it were twice as great, the 1909-47 shift would have been 42 percent; it probably was not appreciably greater, if as great.*

The probable magnitude of transference in all food processing may be inferred from what is now known. The food processing industry may be divided into three sectors on the scale of transference. And we may ask the question: If by some magic a share of the 1947 output of each sector were transferred to the accounts of non-factory producers so that the 1909 proportion of factory to non-factory output were obtained, what quantities would be involved?

A highly artificial aspect of this supposition is that the current high level of output of processed foods probably would not have been obtained without a full-fledged factory system, hence the supposition is not theoretically possible. However, it yields some insight into the maximum contribution that transferred operations could have made to factory growth.

The first of the three sectors consists of the above-named branches where considerable transference occurred—baking, butter making, canning, and livestock slaughter. Roughly 44 percent of the 1947 output of this sector is affected under this supposition (100 minus the average weighted percentage that the 1909 factory share was of the 1947 factory share). In 1947 this sector made 40 percent of the output of all the food processing industry, as measured by value added.

The second sector consists of food branches in which it appears that virtually no transference occurred. These are breakfast foods, rice, starch products, vegetable oil products, malt and malt liquors, soft drinks, chocolate and cocoa, sugar, flavorings, cheese, canned milk, ice cream, canned fish, and baking powder. This sector contributed 47 percent of the output of all food industry.

In between lies the third sector, consisting of food branches in which some transference occurred but probably less than in the first sector. These are wines, candy, pickles, salad dressings, vinegar and cider, sausage, noodles, dressed poultry and miscellaneous food preparations. This sector contributed only 13 percent of the output of all food industry.

The above information may be summarized in this way: The percentage of the output of the first sector that would be affected under our supposition is 44; in the second it is zero; and in the third sector it is between zero and 44. These results may be combined in an average for the total industry by using a weighting pattern shown above (i.e., 49, 47, and 13). The answer is 18 or 23, depending on whether zero or 44 is assigned to the third sector. These figures may be taken as the range within which the true figure falls.

If this is correct, an important inference can be drawn: Although transferred activities were a significant cause of the growth of commercial food processing, advances in other factors were of even more importance. These factors appear to be consumer incomes, consumer preferences, and processing technics that lower costs or introduce or improve products. This idea is useful in speculating about the future prospects for the industry.

Future Prospects

In the food industry there is a more or less direct relationship between the number of people and food requirements. Current evidence suggests a 20 percent increase in population in the next 25 yr. For this reason alone, the food manufacturing industry probably will expand output only about 20 percent in the next 25 yr.

It remains to assess the probable course of manufactured food production per capita. From 1909 to the average of 1946-48, per capita production increased 125 percent. The average annual rate of growth was about 2.0 percent.

As an initial approach, let there be two hypotheses about the future growth of food manufactures. In the coming 25 years the average annual growth rate per capita will be (1) at least as large as 2.0 percent, (2) zero or negative. Both of these statements are unreasonable.

Continuation of a 2 percent growth rate is unlikely. Studies of long term production trends show that invariably the growth rate tapers with the passage of time.** Two types of evidence show why this rule may apply to food manufacturers. First, the future possibilities of transferring processing activities to factories will probably be less than in the past because the reservoir of transferrable operations has shrunk. Second, the excess of exports over imports of manufactured foods in the 40's due to wartime conditions, caused the average growth curve of the past 40 yr. to be somewhat steeper than it would otherwise be. The 1909-40 growth rate averages only 1.8 percent. Up to the present decade the United States had decreased exports and increased imports, a condition likely to prevail in the coming years (see Table II).

A zero or negative per capita growth rate is also unlikely because it means that the major forces that caused the rapid growth of food manufactures will cease. This would rule out any significant future increases in per capita-real incomes, consumer preferences for food manufacturing services, or advances in technics of processing. More likely there will be major advances in all three factors.

What point between zero and 2 percent the growth rate will attain in the next 25 yr. can only be guessed at. The author believes that a rate between one-half and three-quarters of the previous rate is a likely possibility In this event, the annual per capita growth of food manufactures would average between 1.0 and 1.5 percent—an increase in per capita output of between 28 and 45 percent in 25 yr.

In combination with a probable 20 percent increase in population, the total growth of the food manufacturing industry would be between about 55 percent and 75 per-

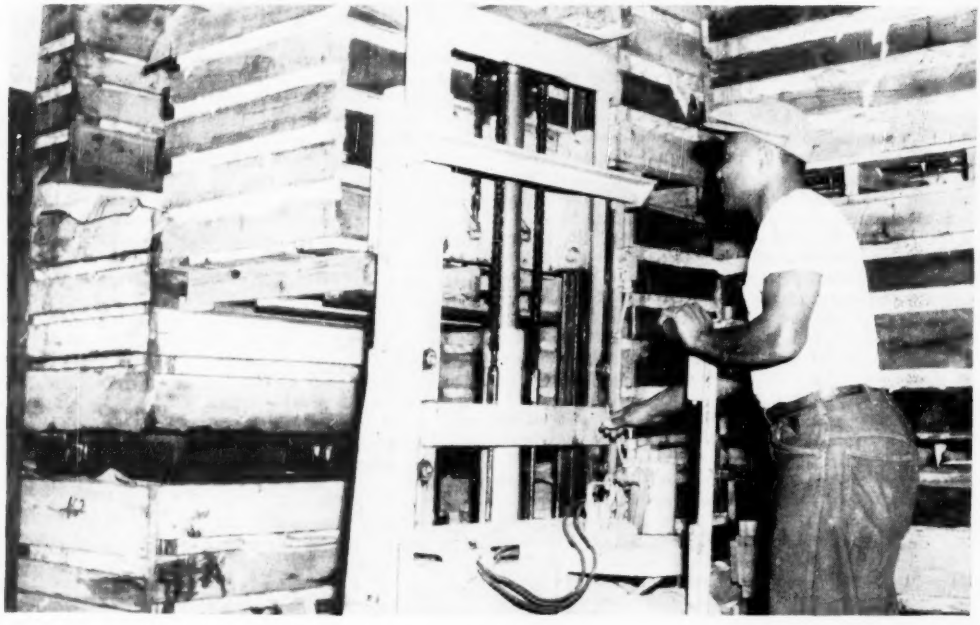
(*Turn to page* 179)

* A 42 percent shift would mean that only 31 percent of the canning occurred in factories in 1909. It is not likely that the factory share was much less than 31 percent because commercial canning was well developed by 1909 and the major market for commercially canned foods, the urban sector, comprised about 45 percent of the population.

** See A. F. Burns, *Production Trends in the United States Since 1870*, 1934; and S. Kuznets, *Secular Trends in Production and Prices*, 1930.

No More of This!

Now—Fish Are Stacked by Power-Lift and Pallets



Mechanizing Halves Their Handling Costs

Newark plant slashes case charges from $4.36 to $2.22 per 100 . . . Equipment pays for itself twice over in 17 months . . . Article gives all figures

G. N. COLLINS
Formerly General Works Manager, J. W. Beardsley & Sons, Newark, N. J.
Now Senior Staff Member, Wallace, Clark & Co., New York City.

Our adoption of modern, unit-load materials handling equipment and methods in the Newark, N. J., plant of J. W. Beardsley & Sons has—

- Saved more than $1,500 per month,
- Made tasks easier and safer for the help.
- Improved sanitary conditions, and
- Safeguarded the products against losses.

Specifically, our switch to palletizing eliminated many hours of back-straining labor in refrigerators; has kept goods mobile and off the floors, thus aiding in plant housekeeping and rodent and insect control; lowered the danger of product contamination in refrigerators from ammonia; and greatly reduced the chances for accidents by eliminating heavy lifting, pushing, hauling and the necessity of men climbing on stacks of fish.

Previously, we had been advised that modern materials handling technics were not feasible in our operations because of the characteristics of our product, salt codfish, and our plant's structural limitations. However, after careful investigation into available equipment, painstaking planning, and complete cooperation of personnel we did the job and have been able to realize very significant economies and corollary benefits.

Here Is the Story

Due to the rising cost of common labor, as well as the difficulties of obtaining employees willing to do manual work on fish in refrigerators, materials handling had become an item of major concern to the company. In April 1948 a survey was undertaken to determine what measures could be taken to mechanize the operation.

As a result, we almost completely mechanized the work, and this reduced the cost of materials handling from $4.36 to $2.22 per 100 cases shipped, saving $27,000 in the first 17 months of operation with a total investment in new equipment of $13,486.00.

Let us first give the background picture:

Products packed in Newark are shredded salt codfish, peanut butter, prepared mustard, dried beef, and smoked herring. Fish cakes are packed and cased in the company's plant at Eastport, Me., and shipped by rail in carload lots, to be distributed from Newark along with other items.

The Newark plant consists of a two-story building of mill type, wood-frame construction. Loading on the second floor is limited to 100 lb. per sq. ft. Located on the second floor are three refrigerators for beef. Four refrigerators for fish are on the first floor. There are two 2,000 lb. capacity freight elevators in the plant.

Most areas of the first floor are covered by maple on 4x4-in. sleepers resting directly on the earth. This floor, while able to sustain a substantial distributed load, would not withstand a concentrated live load of 1,000 lb. because the flooring between the sleepers would break and drop to the ground level.

The plant rail siding and trucking dock, at first floor level, is about 24 in. below the level of the average freight car or trailer truck.

There is a Quonset hut containing 3,200 sq. ft. used for storage of empty glass and packing supplies. This building has a concrete floor permitting unlimited loading, and is at the elevation of the average freight car. It is connected to the shipping platform by a concrete ramp with an 8 percent grade.

Fish is received in bulk by rail, packed in refrigerator cars in a loose, wet, salted condition. It is initially stored loose in large volume in the plant refrigerators, is then skinned and boned, dehydrated, shredded, and finally packed in 4-oz. boxes in 1 doz. shippers.

Fish cakes in 10-oz. cans are received in corrugated cartons of 2 doz. from the Eastport plant, stored, and distributed from Newark by company truck and common carrier.

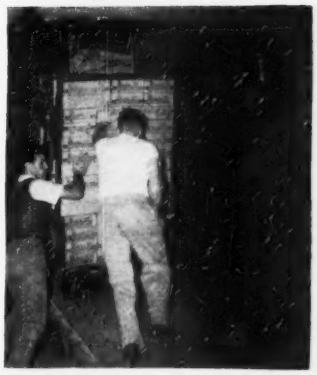
Peanuts are received in 100-lb. bags, processed, and packed in glass jars of various sizes. Filled jars of peanut butter are stored and shipped in the same corrugated containers in which the empty jars are received from the glass plants by car load.

The ingredients of mustard consist of mustard seed and spices, received in 100-lb. bags, and vinegar, received in barrels. Similarly to peanut butter, mustard is packed in glass jars of various sizes and stored and shipped in the same corrugated cartons in which the jars are received.

Cured dried beef hams are received by truck in wirebound boxes or barrels, refrigerated, processed, and packed in glass under vacuum. Like the other glass-packed products, dried beef jars are packed in reshippers.

Herring is received in bulk from

This Was Tough



"UGH—and don't leave go!" This old method of pushing and tugging was really dangerous.

But It's Safe, Simple...

ROLLING 'em into truck is easy—with lift unit on dock, roller dolly on trailer floor to receive pallet load.

...The Unit-Load Way

COMING OR GOING, it now takes only one man with a lift truck and pallets to move products.

Eastport, refrigerated, and packed in Pliofilm bags and display cartons. These in turn are placed in 2- and 4-doz. corrugated shipping cartons.

At the inception of the survey the handling of all these materials was manual, using 2- and 4-wheeled hand and platform trucks The problem of mechanizing this operation resolved itself into—

A. Finding electric pallet-handling and stacking equipment which (1) would operate loaded on second floor without hazard or building damage; (2) when loaded would make a 90 deg. turn through a 42-in. refrigerator door into a corridor 6 ft. wide, then another right angle turn through another 42-in. door into refrigerator; (3) would negotiate 8 percent-grade ramps from shipping platform into freight cars, trucks, and Quonset hut while loaded; and (4) would permit stacking of loaded pallets in the Quonset to a maximum height of 15 ft.

B. Finding an inexpensive way of reinforcing the first floor so that it would take concentrated live loads of 2,000 lb. (Having only a short-term lease on the building, the firm did not want to go to the expense of laying a concrete floor, estimated at $7,500.)

C. Finding a satisfactory pallet for handling loose salt fish, case goods, bagged goods, boxes and barrels.

Equipment Selected

There was, of course, that limiting factor of weight on the second floor. Accordingly a search was made for light electric pallet-moving equipment. The machine chosen weighs 2,120 lb., including batteries and it has a very short wheel base. Its forks will elevate a 2,000 lb. pallet load 83-in.

The model selected was an outrigger rather than counter balanced type. Somewhat lighter, the outrigger has a short enough wheel base to make our 90 deg. turns in the 6-ft. aisle. The machine, fully loaded, negotiates our 8 deg. ramps with ease. Use of this outrigger machine forced employment of the non-standard "airplane type" pallet having projecting top boards to allow for passage of the outrigger's forward-projecting wheels. We purchased two such machines, one for each floor. No attempt is made to use them on the elevators.

The next problem to circumvent, and without great expense, was the inability of the wooden first floor to sustain heavy concentrated loads. This was accomplished by overlaying 5- x 6-ft. sections of 3/16-in. diamond tread steel floor plate directly on top of the wooden floor. This distributes the concentrated live load. The cost was only $1,400.

Having solved the first floor load problem, we were free to use any type of fork truck in the main buildings, shipping dock, and Quonset, so long as it would "go" in the aisle widths. The survey indicated that two powered stacking units would be required on the first floor—a riding type for shipping, receiving, and warehousing; a pedestrian type for production purposes on fish, glass handling, elevator service, and for use in the downstairs fish refrigerators.

The limiting factor for the production unit was the ability to enter the 42-in. refrigerator door, make a right angle turn to the left, in a 6-ft. corridor, advance 10 ft, and make another right-angle turn to the right, to enter the refrigerator room. It was found that the same unit in use on this ground floor was better able to "work" this route than any model available at the time. In fact, it was the only one. In addition, the machine can successfully negotiate the ramp to the Quonset and the ramp into freight cars.

Shipping studies disclosed that a 1,000-lb. unit load would accommodate 50 cases of all products. Because of the narrow aisles and loading dock, there was selected one of the smallest riding-type fork trucks with maximum maneuverability and maximum stacking freight. The forks of this unit can be raised to 134-in., allowing us to stack pallets to a height of 15 ft. Collapsed height of the mast is 78-in., permitting entrance into all freight cars, trailers, and most trucks.

Proper engineering of any palletized operation usually requires the use of a few hand pallet trucks designed for the movement of palletized materials from floors to elevators, from forward storage to production lines, or from production lines to short storage areas.

Keep Power Units Busy

Investment in electrical equipment is too great to have such units stand idle. Cost of the hand pallet truck is much less. Accordingly, the powered trucks are carefully scheduled between pick up and delivery points for maximum utlization, and hand pallet trucks are made available to operators at strategic points. The combination of such units proved feasible. The hand pallet truck chosen has an hydraulic foot pedal, making the raising of the load from the floor a simple matter.

Selection of the straddle-type pedestrian truck, the counter-balanced automatic fork truck, and the hand pallet jacks, necessitated a special pallet. The size of our loads and our refrigerator door clearances dictated a 32x40-in. pallet. The outrigger called for the airplane type pallet, and the hand trucks required openings in the bottom faces for the wheels. All case goods, bags, barrels, bundles are carried on these flat pallets.

Loose salt codfish as received from Canada can be laid on the flat pallets to form a 1,000-lb block about 3-ft. high. While single pallets thus loaded are stable enough, it was found that stacking two high would compress the fish on the lower pallet unevenly, causing the stack to tip over. To overcome this, a flat locking frame, the size of two pallets, is placed over two adjacent pallets before stacking the

Keeps Skilled Labor on Skilled Work

NOW, this professional fish skinner devotes his time to dressing the product, needn't waste time toting it around. Under old system, he spent 4 hr. a day handling instead of skinning fish.

second tier. It is possible to stack pallets of loose bulk salt codfish three high in the refrigerators in this way without danger of tipping.

In the skinning and boning process, the fish are cut into pieces of such size as to preclude stacking on flat pallets, hence some sort of a box pallet was indicated. The only metal stacking box pallets which would withstand the attack of the salt brine would be of stainless steel. Their cost would have been prohibitive. Consequently, a box pallet was designed, holding 1,200 lb. of loose fish, that can be stacked three high in the refrigerators.

Mention has already been made of the 24-in. difference in elevation between the levels of our shipping and receiving dock and the freight cars and trucks.

We formerly used heavy wooden gang planks about 25 ft. long having two wheels in the center. Tugged around by several men, these were used to carry the 2- and 4-wheeled hand trucks into car and trailers. They were difficult and dangerous to use, hence now have been supplanted by lightweight sectional magnesium ramps which can be handled easily by one or two men. The ramps are equipped with lugs so that they can be handled by the fork trucks.

Fish Unloading Speeded

Labor savings on salt-fish operations were striking. Formerly, unloading of a 30,000-lb. car required four men in the freight car piling fish on 4-wheeled trucks, four men hauling the trucks, one weigher, and six men, in rubber boots and sheeplined coats, in the refrigerator stacking the fish on the floor to ceiling height. It required a day to unload the car.

The same work is now done in but half a day, with the four men in the car loading the pallets, one man with the power truck, and one weigher. No men are required in the refrigerator, since the electric truck does all of the stacking.

The former method took 112 man-hours per car, the present method only 48. The new way saves $2,000 per year.

Having piled the fish in the refrigerators before skinning, it is necessary to remove skin and bone, then replace the fish in the cooler. Production is not continuous because of its seasonal nature. Large inventories of fish prepared for grinding must be ready for the peak lenten and fall seasons.

The former method required the handling of whole fish from the floor stacks onto 4-wheeled trucks, hauling to skinning benches, skinning into barrels, towing the barrels back to the refrigerator, unloading the barrels onto the floor, and restacking to the ceiling. Later, when the fish were needed, it was necessary to unpile into barrels and haul out to point of use on 2-wheeled stevedore trucks.

Most of this work was done by professional skinners who were the only ones who cared to handle the fish. These men spent, on the average, 4 hr. of a 9-hr. day doing materials-handling instead of skinning fish.

Today, a fish skinner takes the pedestrian truck and within 5 min. has his pallet load of whole fish at his hand ready to work. He throws the finished fish pieces into a pallet box. This box is weighed, to compute incentive earnings, and is returned to storage in the refrigerator within 10 min. Instead of spending 4 hr. per day piling, unpiling fish, and hauling, a skinner now does this work in 30 min. This is a saving of 3.5 hr. per day per man. Employing six such men steadily, 21 man-hours per day are saved—in dollars, a total of $5,500 per year.

Loss Hazard Minimized

A corollary benfit of storing the refrigerated fish on pallets is the emergency value. Each refrigerator has a capacity of 168,000 lb. of fish valued at $50,000. A leak in the ammonia cooling pipes could ruin the entire contents of the box because of the inability to remove the floor-stored fish before contamination by ammonia.

On the other hand, 14½ pallet loads, 1,200 lb. each, can be removed in about an hour.

New glass jars in reshippers, bagged peanuts, mustard seeds, boxes of dried beef hams, and all other items received, are now handled on pallets. The standard crew is two men palletizing and one man operating the fork truck. This crew normally unloads and stacks in the Quonset the contents of the average car in a half day or 12 man-hours.

Compared to the old system—using 4-wheeled trucks, two men in the car, two truckers, and two men in the hut all day, for a total of 48 man-hours—the new system represents a 75 percent saving.

Reserve stocks of all supplies are maintained in the Quonset. Forward stocks of two days operating requirements are stacked in the processing building adjacent to the head ends of the production lines. Daily requisitions are given to the yard foreman by the production foreman to replenish items consumed each day. The fork truck is used for the deliveries to the first floor production stations and to the elevators. The pedestrian type trucks supply the production lines on the first floor with supplies from the forward stocks or refrigerators.

On the second floor, which cannot sustain the fork truck, the pedestrian truck picks up pallets from the elevator and stacks in the forward stock. It unstacks and supplies the upstairs production lines with supplies. All of the production lines are completely conveyorized up to the case-sealing, after which all items are palletized, and placed, by the hand pallet trucks, within reach of the powered equipment.

Formerly, Quonset warehouse storage was stacked case by case on the floor. Four-wheeled trucks had to be unloaded, and the materials manually stacked 15 ft. high, with extra men on several tiers handling cases "bucket brigade" fashion. Likewise, at time of movement to forward stock the cases were loaded back onto 4-wheeled trucks, hauled to the production points, and again stacked. At time of use they had to be re-piled on the truck and placed adjacent to the machine. Upwards of six individual case handlings were thereby reduced to two—on the pallet and off the pallet at time of use. All other handling is done in large unit loads.

Packed foods are brought to the shipping department and stacked in unit loads. For each product, a pallet pattern (number of cases to a pallet) was selected that was divisable into the most usual quantity of issue. Thus, for carload and most truck shipments, unit loads can be placed in cars and trailers without handling individual cases.

These patterns, in all cases, provide pallet quantities of 25, 50, and 100 cases. In loading cars, the fork truck enters the car and places a pallet in each end, where two men unload. Time of loading a car was reduced from 112 to 48 man-hours.

Roller Dolly Effective

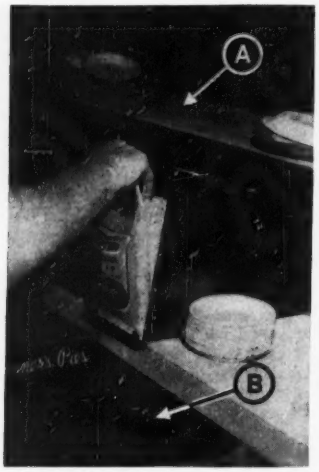
For loading trailers, there was devised a special dolly consisting of a short section of standard roller conveyor the width of the base of the pallet. This is placed, roller side down, on the tailboard of the trailer, which is 24-in. above the loading dock. The fork truck places a pallet load on top of this roller conveyor dolly. The driver can then push the dolly to the head end of his trailer and unload.

This type of dolly, having a greater rolling surface than the average dolly, distributes the load and makes it easy to move the pallet the length of the usually rough and uneven trailer floor.

For small orders, 5, 10, or 15 cases of an item, it is necessary to do "stock

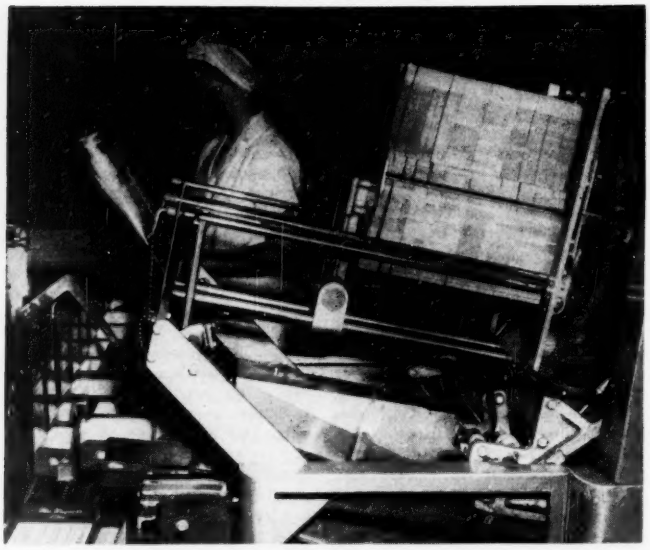
(*Turn to page* 178)

From slow bagging . . .



FIRST, old pie-bagging job was revamped by installing belts—(A) and (B)—to deliver pies and cartons to packers. And special pneumatic bag-opener was set up (center).

. . . to speedy cartoning . . .



THEN by adopting automatic cartoning machine, productivity per girl-hour was increased by one-third. Unit picks up carton blanks, forms them, feeds in paper cups, and closes cartons at the rate of 50 a minute.

Low Cost Packaging Brings Back 5c. Pies

Wagner devises machine that forms trays for pastries, wraps them in transparent film at 90 a min. Package is attractive, costs less than window carton

DON COPELL
Director of Engineering,
Wagner Baking Corp., Newark, N. J.

One of the biggest headaches suffered by the pie baker today is the high cost of packaging. And because this cost is so far out of line, production of 5c.-size pies had long been out of the question.

With labor costs rising, and higher prices for ingredients and wrapping materials, we had been seeking a cheaper means of packaging the 10c.-size pies—a method of cutting our overall packaging cost from about 12 to 5 percent. And by slashing the cost to this level we even hoped to get back to the nickel pies.

Our endeavor was along two lines: (1) Combing the market for a low-cost, attractive package, and (2) getting a high-speed machine to handle it.

After a long and careful study of our pie-packaging operations, we finally came up with an inexpensive, yet attractive, package and a specially designed machine to take it—at a higher rate and with less labor.

What's more, the new package and machine have enabled us to again offer a 5c. pie.

There were three major steps in achieving our present efficiency. First, our old pie-bagging line was revamped. Two conveyors were installed to deliver pies and cardboard trays directly to the packers. And efficiency was further increased by furnishing each packer with a special pneumatic bag-opening device.

Output Upped One Third

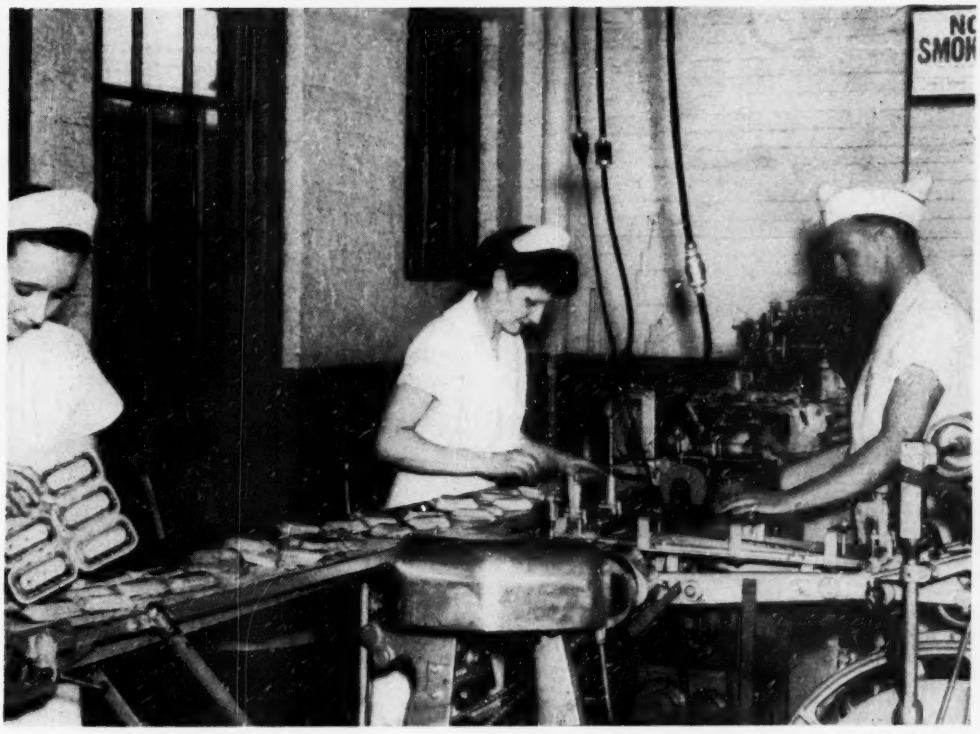
This revised system increased production about 35 percent over the former tedious method of bagging the pies. Output on this more efficient line was raised to 8,500 10c.-size pies per hour with 12 girls—or about 12 packages per minute per girl. The 12 girls include the supervisor. Two additional girls sort the pies for route trucks.

Cost of the printed glassine bags was rock bottom—$1.40 per 1,000—but such bags could not be used on high-speed packaging machines. Consequently, our second step was to get higher productivity with a package that could be handled by machine.

Accordingly, an automatic pie-cartoning machine, recently put on the market, was installed. Output on this machine was 3,000 single-pie cartons of pies per hour—or about 17 per minute per girl. Using this machine, we increased productivity per girl-hour more than one-third again—about 39 percent.

By placing this cartoning machine at the tail-end of the bagging line and adding three more girls, output on the resulting dual line was a full 11,500 packages per hour.

. . . and then to still-faster tray wrapping!



AND NOW, tray-forming and wrapping machine has raised production to 90 pies per minute. New unit forms boats, from a machine-fed roll, overwraps them with cellophane, then heat-seals film.

The cartoning unit automatically picks up a carton blank from a magazine, sets it up, feeds in the paper cup and closes the carton after a girl inserts the pie.

Cost of the laminated, window carton was $7.25 per 1,000. But this $5.85 increase in the cost of the carton over the bag was partially offset by these five advantages: (1) Production per girl-hour, as stated, had been increased about 39 percent; (2) cartoned-pie sales zoomed approximately 40 percent; (3) damage to pies during handling by the consumer, as in the case of bagged pies, was reduced; (4) these packages were rigid and more attractive, and (5) a saving was realized by printing the variety on the carton, thus doing away with the old, more costly variety-bag inventory system.

Despite these benefits, cost of the cartoning was too high. Logically enough, our final step was to obtain a lower cost package that could be handled by machine at a still higher speed.

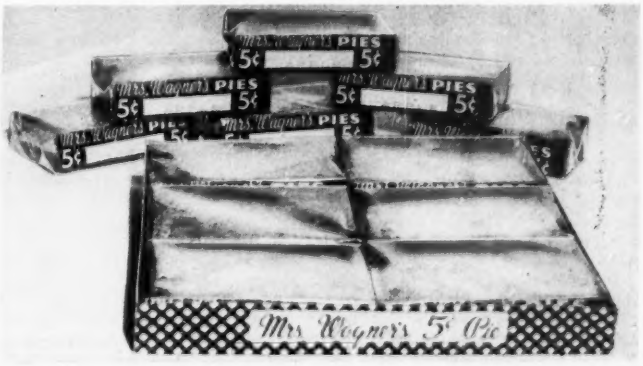
A low-cost, eye-appealing package was found, and we developed a new machine to wrap either 5-or-10c.-size pies at the rate of 5,400 per hour with four girls, or more than 22 packages per minute per girl. Cost of the new package—a printed cardboard boat and an unprinted cellophane overwrap—is $2.47 per 1,000. This amounts to a $4.78 saving per 1,000 over the window carton. Part of this saving is attributed to the elimination of the paper pie cups that cost $1.28 per 1,000.

Productivity per girl-hour was thus increased 83 percent over the improved bagging system and 30 percent over the cartoning method.

Other noteworthy benefits of the

(*Turn to page* 180)

Here's the new five-center



Richardson grapples with problems here . . .

IN THIS MACHINE SHOP, new efficient units are developed to speed operations. Here, net-weight scale attachment for wrapper is being put together to eliminate under-weights and keep down over-weight tolerances.

Engineering Is the Answer to Big Demand

Leading mint company keeps on proving it—by astute adoption of advanced units, practical changes in present equipment, and by "making its own" in the pinches

JOHN V. ZIEMBA
Assistant Editor, "Food Industries"

There has been a constantly growing demand, over the years, for the candies produced by Thos. D. Richardson Co., Philadelphia, pioneer in the manufacture of the confection tradenamed After-Dinner Mints.

Accordingly, the company has constantly had to be on its toes in devising practical ways of increasing its production to meet this demand. And its major improvements have never failed to keep the pace.

Initial developments that made the company a leader in the confectionery field were introduced by the late founder, Thos. D. Richardson. Tolbert N. Richardson, Sr., carried them on. And now President Tolbert N. Richardson, Jr., and John M. Wood, chief engineer, are further perfecting the technics.

The foresighted company made extensive studies, and these revealed certain processing steps where there were inefficiencies in the use of time and labor. Particularly targeted were handling, cooking, cooling, and packaging operations.

The answer was found in a threefold approach: Design and construction of new devices in the machine shop, modifications on present equipment, and purchase of advanced units.

Major Achievements

These engineering changes have continually paid dividends—in greater production, lower operating costs, easier working conditions for employees, and better product quality.

In all, ten important changes have been made in mint production:

1. Sugar is now automatically weighed and dumped into melting kettles. Water is then metered in.

2. A specially designed duct system removes steam from kettles.

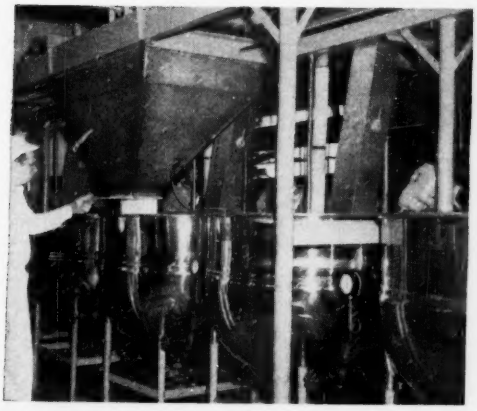
3. Magnetic separators and filters remove any foreign material from the products.

4. Ingenious new continuous cooking and cooling facilities have been adopted.

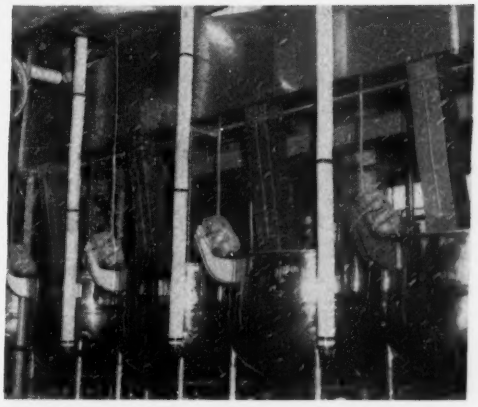
5. Special candy pullers were designed to handle large batches—300 lb.—and thus assure greater product uniformity.

6. Automatic scoring machines have been invented. First they form each

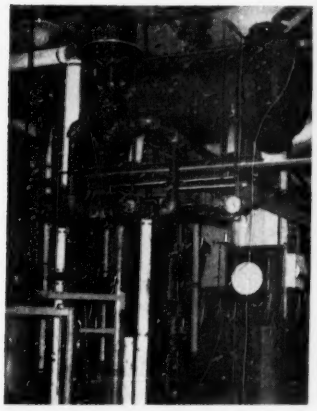
. . . thus achieves greater efficiencies here



THIS SPECIAL handling system was designed to automatically feed sugar to the six melting kettles.

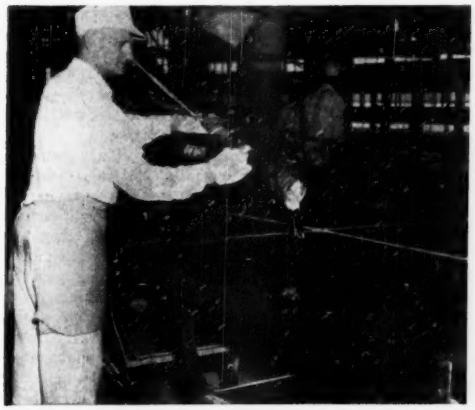


EFFICIENT stainless-steel duct system replaces former hooded exhaust unit for removing steam from kettles.

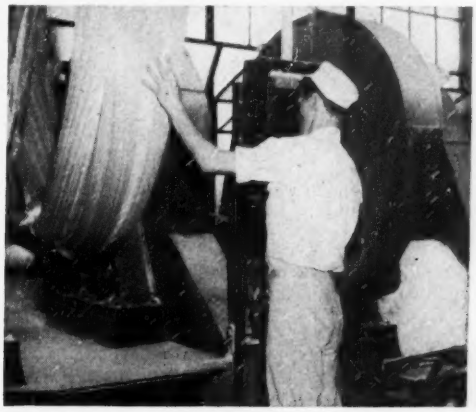


CONTINUOUS COOKER (top), has 6,000-lb.-per-hr. capacity.

NEW 70-ft. stainless steel band conveyor cools 4,000 lb. of candy an hour. Belt is air- and water-cooled. Bell (top) signals men when to cut 100 lb.

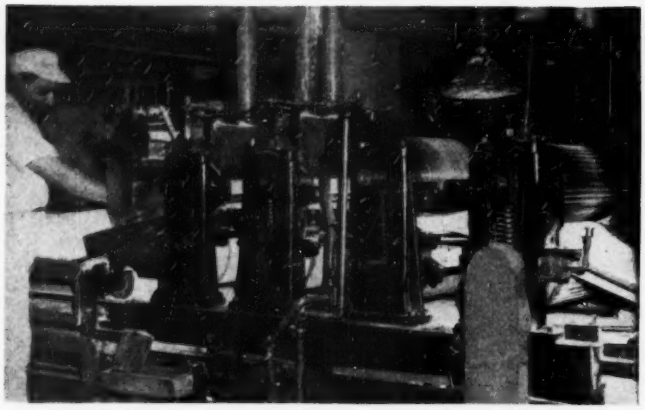


PIPE, suspended from trolley mounted on circular monorail, enables worker to pour candy onto 36 cooling tables.



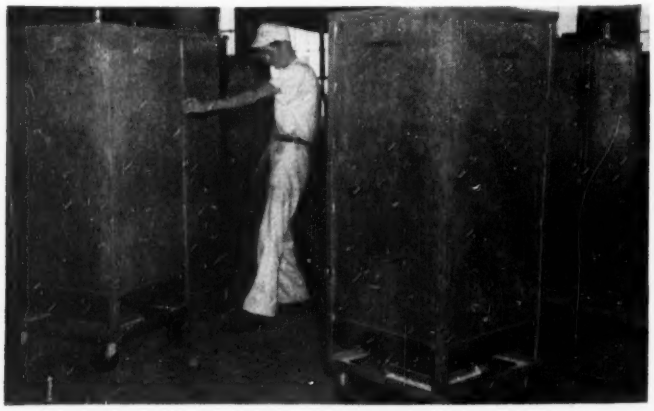
THESE large candy pulling machines handle 300-lb. batches of mint candy. Pulling is automatically timed.

These Units Simplify Cutting and Handling



SCORING MACHINE was built to form 300-lb. batches into sheets, that are then scored. Unit consists of pairs of sizing rolls and rotary cutters.

STAINLESS-STEEL trays for 5-lb. sheets of mints were designed for durability and to eliminate troublesome splinters, nails and screws.



BIN-TYPE TRUCKS hold 500 lb., replace cumbersome 20-lb. cardboard tote boxes. Trucks facilitate handling, save labor and floor space.

batch into a continuous sheet then it is scored by means of rotating knives mounted on rolls.

7. A vacuum system has been installed to remove loose powdered sugar from the dusted mints at the scoring and breaking machines.

8. Special metal and fiberboard trays and bin trucks have been fabricated to facilitate handling.

9. Scored mints are broken into uniform pieces by means of a special vibrating belt. A similar belt is used to pack down bags of mints in cartons.

10. High-speed, labor-saving packaging machines, equipped with net-weigh scales have been constructed. Some units are company-made, some are standard, and others are company-modified.

Now for details of these many developments:

Special Sugar-Handling System

A production-speeding handling system has recently been developed for automatically feeding sugar into six nickel-and-stainless-steel jacketed melting kettles. Movement of bags of sugar from the basement to the fourth-floor cooking room is by freight elevator and lift truck. Bags are emptied into a hopper, and the sugar is flight-conveyed into an 8-bag capacity metal hopper that rides on four flanged wheels over two channel-iron rails between conveyor and melting kettles. Sugar is dumped directly from the hopper into the kettles. Here, cream of tartar is added.

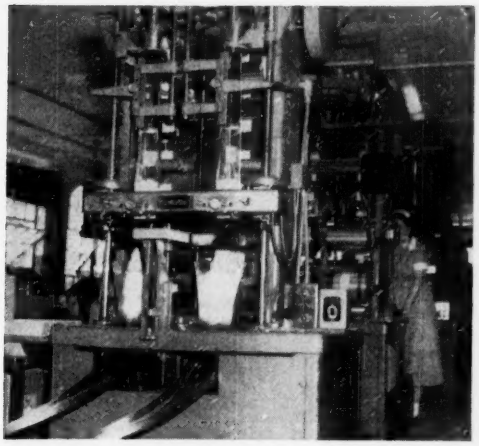
Plans are now underway to install a bulk sugar receiving and handling system. This is how it will work: Sugar will be received in hopper trucks and conveyed to stainless steel storage tanks. From here, another conveyor will deliver the sugar to batching scales over the melting kettles.

Preheated water is now metered into the kettles by automatic flow meters of the pre-set type. The water is preheated to 140 deg. F. in a steam-coil unit to cut down on the cooking time—about 2 min. are saved—and to minimize subsequent discoloration due to sugar caramelization.

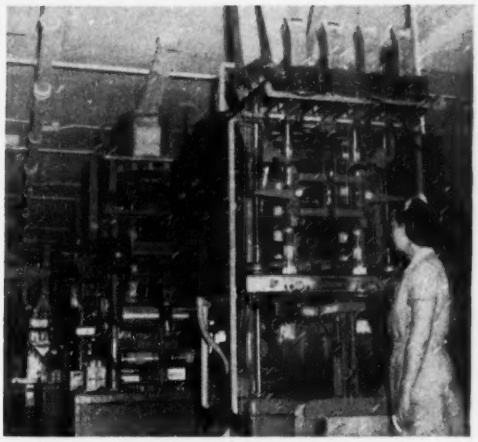
The melting kettles are equipped with a specially designed, stainless steel duct system for carrying off steam. From each tight-covered kettle, an 8x8-in. vertical duct carries the steam through a manifold and a 24-in. pipe to an exhaust fan that maintains a low vacuum in the kettles. This highly efficient steam-removal method supersedes the former dirt-catching, hooded exhaust system. And workers are overwhelmingly pleased with it, since there is no longer any hot steam in the room.

Kettles are also equipped with

High-Speed Packaging Units Cut Down Bottleneck

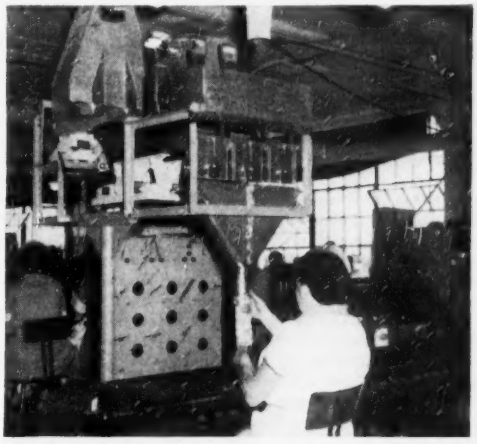


STANDARD WRAPPERS turn out 60 packages per minute per machine. They form bags, fill and seal them.



MODIFIED wrapper, fitted with four net-weight scales (top), avoids damage of the more delicate mints.

BAG-FILLING line has three machines. Each accurately weighs and fills mints into bags placed under feed spout.



NEWEST bag-filling machine is equipped with three net-weight scales to omit check-weighing before sealing.

propeller-type mixers designed by the company. These built-in, heat-resistant mixers are motor driven through reduction gears that are sealed in a gear box to prevent grease from contaminating the candy.

Ingredients are melted and cooked to 240 deg. F. Automatic temperature controllers terminate the cook in the melting kettles. With this improved temperature-control technic, it is possible to initiate cooking by pushbutton. All that an attendant is required to do is fill and empty the kettles.

There are distinct advantages in using the temperature controllers. Since there is control of the rate at which the temperature rises and the end temperature, caramelization of sugar is minimized and production is increased.

Removal of possible extraneous matter is the next step. After the ingredients have been cooked, the candy is drawn through magnetic separators and pumped through filters with fine-mesh, stainless steel disks.

Next, the candy gets a final 310-deg. F. cook. Here, it is pumped into one of the two continuous cookers. Providing capacities of 4,000 and 6,000 lb. per hour, respectively, these units were originally designed by Thomas D. Richardson. The higher capacity unit has 298 ft. of copper steam coils.

All the melting kettles are connected to both cookers. In normal operation, one kettle is being filled and another emptied while the others are cooking the ingredients.

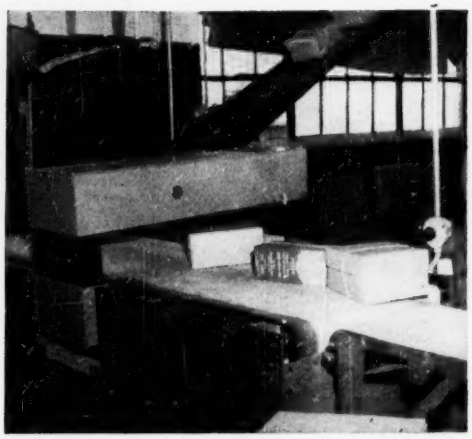
Two Efficient Cooling Methods

Outstanding mechanical and engineering improvements have been made in the cooling process, of which there are two methods—batch and continuous. The new continuous method is the more efficient.

In the older batch method, candy is pumped through a 2-in.-dia. copper pipe into a steam-flasher, where steam pressure is released from the candy before it is discharged by gravity through a feed pipe onto metal cooling tables. The feed pipe

Electronic Machines: Assure Proper Weight, Spot Tramp Metal

UNITS (foreground) electronically check-weight each package coming from Stokeswrap machines (background).



ELECTRONIC DETECTOR (left) spots any stray metal in cartons going from packing to casing stations.

swivels in two places, thus is flexible, and it is suspended from a trolley riding on a circular monorail. With this arrangement, the attendant can readily swing the feed pipe in any direction and pour the candy onto any one of the 36 3x6 ft., water-jacketed cooling tables, which hold 50 lb. each.

Credit for the development of the continuous hard candy cooler goes to Tolbert N. Richardson, Jr. The cooler is a five-section unit comprising a 32-in. wide and 70-ft. long stainless steel band conveyor onto which the candy is fed from one of the continuous cookers at a rate of 4,000 lb. per hour.

There is double-action in the cooling process. First, the surface of the candy is cooled by blasts of air. Second, cold water sprays, spaced 18 in. apart, play on the underside of the conveyor. The spray water flows counter to the direction of belt travel. The first section of the feed end uses the warmest water, which has been progressively pumped from the other four sections. In the fifth section, water is pumped directly from the city main to the spray headers. The water is sprayed at the rate of 6 gal. per minute. On returning to the feed end, the conveyor travels through a 3-ft. cold-water bath.

At the discharge end of the cooler, a bell rings every 2½ revolutions that the 4-ft. dia. conveyor pulleys make, thus signalling two attendants to cut candy into 100-lb. batches.

Notable savings in man-hours have been achieved by the continuous cooler, which requires only three men —two to cut the candy from the discharge end of belt and one to truck it to the pulling machine. On the other hand, six men are needed to batch-cool the candy. One pours the candy on cooling tables. Two turn the slabs of candy. Another fills each truck with six 50-lb. batches. And two men push each truckload to the pullers.

Other advantages of the continuous cooling process are the achievement of more uniform cooling and the considerable savings in floor space.

Now to the candy pulling: There are five 300-lb. capacity pullers and four smaller units for 200-lb. batches. In this operation, the candy is aerated for about 5 min. to start sugar crystallization. The pulling is automatically timed. Color and flavor are added at this point. The larger pullers were originally designed by Thomas D. Richardson to handle 500-lb. batches, but the smaller size batches were found more practical.

Mints Scored Automatically

The candy is now ready for scoring. It is loaded onto a truck and carried to the batch former, where it is shaped into a large roll. Next, the roll is fed to the scoring machine. This unit actually comprises both sizing rolls and rotary cutters. First, the candy passes through two sets of metal rolls that reduce it to a strip of any desired thickness, depending upon the type of mint. Second, the strip goes through longitudinal and cross-cut scoring units.

The first unit consists of a pair of rolls with circular knives. The second is a pair of rolls with horizontal knives. Cuts made by the knives are precisely regulated, for if too deep the candy would adhere to the rolls. One knife on the cross-cut unit divides the strip into 5-lb. sheets. Average speed of the scoring machine is a 300-lb. batch every 4½ min. There are five scoring machines.

To prevent it from sticking to the rolls, the candy is automatically sprinkled with powdered sugar before going through the sizers, and then again before it travels through the scoring units. By means of vacuum, loose sugar is removed from each batch of candy in process, and it then passes through a filter unit, finally falling by gravity into large metal bins. This sugar is re-used. Dirty sugar collected in the filter bags is returned to the refinery.

Sheets of scored mints automatically feed onto stainless steel trays, which are then stacked on dollies. Next, the dollies are rolled to an aging room, where the mints are kept at about 100 deg. F. for 4 hr. During this period, the candies change from the chewy, taffy form to a creamy, melt-in-your-mouth consistency—sugar changes from an amorphous to crystalline form.

The new trays were specially designed for longer life, better stacking, and easier cleaning. Being of metal, there are no more chances of wooden splinters, all too common with the former trays. The new ones are quite able to take the abuse to which they are necessarily subjected—one or more handlings per day from scoring machines to the aging room, into breaking machines, and back to scoring units.

More about the trays: Incorporated in them are special stacking buttons. Thus they won't slide off the dollies. They have Masonite bottoms, with edges protected by steel to prevent damage. In their fabrication, there

are no screws and nails—to get loose and cause breakdowns of machinery, or to find their way into packages.

Developed and patented by Richardson, the trays are manufactured by a local sheet-metal fabricator, who has now made arrangements with the candy maker to offer them to the confectionery industry.

Breaking the scored mints into pieces is the next step. After mellowing in the aging room, the mints are dumped onto an 18-in. wide and 12-ft. long canvas-belt conveyor. Underneath this conveyor are shafts equipped with strips of canvas-belt material. Above the conveyor, over the shafts, are adjustable wooden, canvas-covered baffles. As the candy travels along the conveyor, the canvas strips on the shafts strike the belt. Thrown against the baffle by this action, the candy is broken into uniform pieces.

At the discharge end of the conveyor, remaining powdered sugar is taken from the candies and collected. It is removed for two purposes: To enhance the appearance of the packaged mints and to minimize sugar dust throughout the plant.

Now the mints pass over a wire-mesh belt that screens out small pieces. Then they are chuted to the third-floor bulk stock department, where they are collected in specially designed baffle-bin type trucks. These are 500-lb. capacity galvanized units mounted on casters. They contain conical baffles that prevent mints from crushing.

Feeding the packaging machines on the second floor is next. Each truck is rolled over a floor hopper and the slide-gate at the bottom of the bin is opened.

Handling of bulk stock in this manner provides ample supplies of the mints, enabling the company to cushion differences in output between manufacturing and packaging departments.

With the present bulk handling system, considerable labor and floor space are saved. Formerly, mints were collected in 20-lb. capacity cardboard tote boxes. These were loaded on dollies—15 boxes to a dolly. Boxes were then opened and the mints were dumped into hoppers feeding the filling machines. Four men were needed every 5 min. to load the hoppers.

Now, with the bin trucks, hoppers are filled hourly by just one man. These durable bin trucks are much more sanitary than the cardboard boxes. As for floor space saved, 150 bin trucks now replace 4,000 cardboard tote boxes and 250 dollies.

Packaging is the final step. Hoppers on the third floor feed the mints to five Stokeswrap machines and four Richardson-made bag-filling lines. Of the five Stokeswrap machines, four are standard, volumetric fillers, equipped with adjustable filling cups. The other has a net-weight unit, constructed in the company's machine shop. Actually, it is a modification of the Stokeswrap machine, involving addition of electric eye equipment, along with four net-weight scales in place of the filling cups.

The Stokeswrap machines operate in this manner: Mints drop through a hopper to the machine, which feeds cellophane from rolls and automatically form the bags. Then the machine fills a measured quantity of mints into each bag, heat seals it, and delivers it to Selectrol check-weight units, supplied by Exact Weight Scale Co.

Packaging Improved

The new net-weigh machine was specifically designed to handle the company's special fragile jelly-center mints—for the rotating brush on the standard machine damaged these candies. Another thing: Rewrapping of over- and under-weight bags is eliminated. Plans are under way to convert all Stokeswrap machines into net-weigh units.

Here is how the new net-weigh machine works: Mints go to a scale hopper, and at the same time the machine forms a cellophane bag. At this point, the mints are released from the scale hopper. Then the candy drops through a feed spout into the bag, which is finally heat sealed. A scale beam actuates a shutter that controls the light from an electric eye, stopping the flow of mints when the correct weight (4 oz.) is reached. The rate is 60 packages a minute.

Packages from the machines are chuted to a conveyor that carries them to automatic, electronic check-weight units, which reject those that are over- and under-weight. Then correct-weight packages go to the packing station.

Each check-weigher is equipped with an electromagnetic counter that totalizes the number of packages in three classifications—over, under, and correct weights. These counters serve as an accurate check on production.

Each wrapping machine has two curved chutes that are narrow enough to deliver the bags—sealed edge forward—to the check-weigh unit. By feeding the bags in this manner, jamming in the feed conveyor and by the rejection arm is eliminated. Chutes are also spaced the proper distance so that one bag at a time rides on the check-weight scale.

The Party-Line filling machines for the 10¢ bags were designed 25 years ago by Harry Velton, former chief engineer. Today, these bags are being handled by the Stokeswrap machines. The net-weight fillers are now also used for the larger Party-Line items, such as assorted flavored patties and jelly-center mints.

Each of the four bag filling lines is equipped with three machines. Chutes feed the candy into three hoppers, which in turn deliver the mints to vibrating feeders that supply scale hoppers. When the proper weight is reached, the hoppers discharge the confections into a filling spout. An attendant places a cellophane bag over the filling chute to collect the candies. Bags are then check-weighed and placed upright on a conveyor that carries them to the unit that heat seals the tops. Then they go to the packing station. Production on each line is 30 packages per minute.

High-Speed Bag Filler

Richardson has just developed a new high-speed net-weight bag-filling machine for Party-Line items that eliminates need for check-weighing before sealing. This unit can be used for any size bag.

In operation, candy is fed from a floor hopper into three vibrator feeders. Each feeder discharges the mints into weigh pans on net-weigh scales. And each pan empties into a separate scale hopper. Then three scale hoppers alternately discharge into a chute through which the candy drops into cellophane bags, placed over the spout by hand. The bags are then heat sealed before they go to check-weigh packing stations.

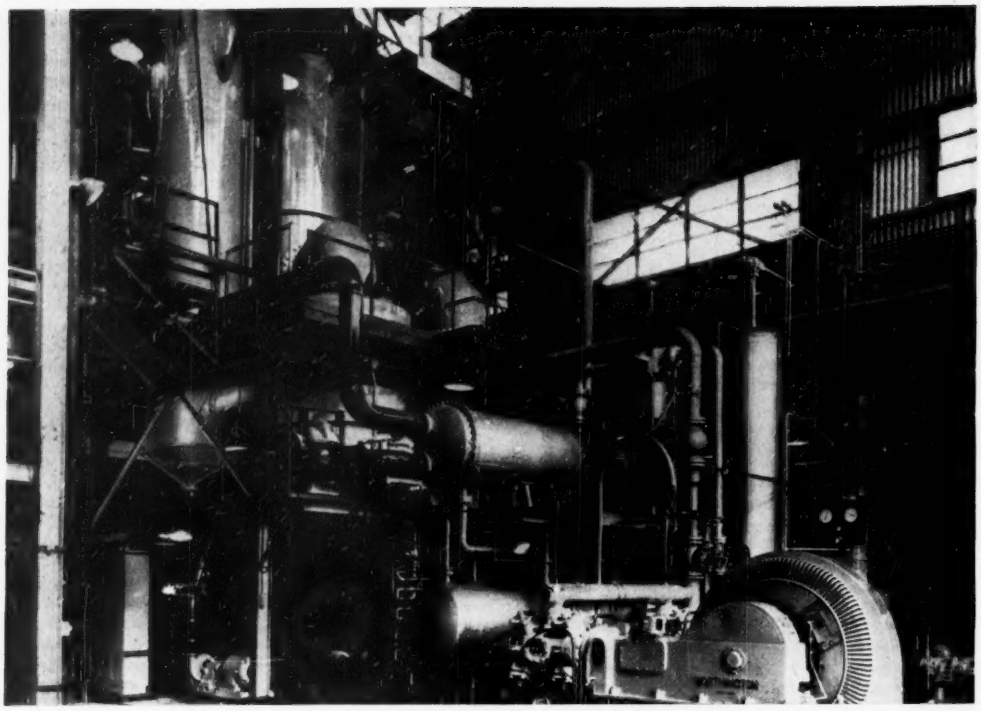
A central panelboard is in front of the operator who feeds the bags. It has three adjusting knobs for each vibrator feed unit. These adjust (1) primary feeder speed, (2) secondary feeder, intermediate feed, and (3) secondary feeder, final feed.

Each vibrator feeder operates at three different speeds during the filling operation. First, the amplitude of vibrations is high for a rough fill. Next, the amplitude is reduced to give an approximate fill. Then, it is further reduced for a precise fill.

Discharge from each of the feed hoppers is regulated by an automatic timer that can be varied for package size and speed of the operation. Capacity of the filling operation is only limited by the speed of the girl feeding the bags. During trial runs, one girl was able to bag 21 packages per minute—more than double the capacity of the original bag-fillers.

At the packing station, 12 or 24 bags of mints are put into a carton. To get a firm pack in a smaller size carton, bags are placed on a canvas-belt that travels over a vibrator.

A rubber-belt conveyor then delivers the cartons to the first floor, where they pass under an electronic metal detector before they are cased.



EFFICIENT new citrus juice evaporator at the Minute Maid plant uses "heat pump" refrigeration system to condense vapor from second effect and heat juice in first effect.

Advances in Evaporation, Freezing Made by Minute Maid Plant

Juice concentrator of new design uses refrigeration compressor in heat pump cycle. Continuous quick freezer is converted beer pasteurizer using alcohol spray. Strict sanitation and quality control methods adopted

H. R. CLOUD

Vice-President in Charge of Production, Minute Maid Corp., Plymouth, Fla

Advances in two basic food industry operations—evaporation and freezing—have been made at the Minute Maid plant at Plymouth, Fla. For the production of concentrated orange juice, Minute Maid engineers Frank E. Penn and Hugh W. Schwarz created a new design, and the company has installed a new Bufkovak double-effect evaporator of the low-temperature, high-vacuum, continuous type which uses a refrigeration compressor in the heat cycle.

Simplified design, lower initial cost and efficient heat utilization are the advantages of this evaporator. Its capacity is 370 gal. of concentrate per hour, and its efficiency is higher than that of the old thermo-compression evaporators used—with automatic control contributing to this efficiency.

Minute Maid's innovation in freezing involves the installation of a continuous alcohol-spray quick-freezer which handles 700 of the 6-oz. cans a minute. It lowers the concentrate temperature from 18 deg. F. to 0 deg. in the center of the can in 18 min. Built by Barry-Wehmiller Co. the freezer is an adaptation of the continuous-spray bottled-beer pasteurizer widely used in the brewing field.

Unusual Evaporator

Each of the two effects of the evaporator unit is a vertical shell-and-tube exchanger, with the juice flowing down the inside walls of the stainless steel tubes. Fresh juice enters the second effect, and the concentrate discharges from the first effect. Heat

for vaporizing water from the incoming juice in the second effect is supplied by the water vapor removed from the juice in the first effect, and this vapor condenses as a result of the heat exchange.

Vapor from the second effect is condensed by refrigeration, and heat for the first effect is supplied by warm condenser water, which is heated by the condensation of the ammonia from the compressor.

In the design of this type evaporator, it was found desirable to use the back-flow principle. That is, the fresh juice enters the second effect and the concentrate discharges from the first effect. This allows the material at its highest viscosity and concentration to be handled at the highest temperature. Also, as the operating temperature of juice is limited to 75 deg. F., the greatest temperature difference is taken when the heat transfer coefficient is low.

The only steam used in the system is that for the vacuum jets, and the volume of make-up water needed is relatively small. A 500-ton ammonia compressor is the source of heat energy for evaporation, and it functions as an efficient "heat pump". Cool water drawn into the system to regulate the temperature of the heating water in the first effect comes from a cooling tower, so water demand is minimized.

Steam-jet evactors maintain a vacuum of better than 29.6 in. in the evaporator. Juice temperature never goes above 75 deg. F. and is about 60 deg. at 10 mm. pressure. At these temperatures, the evaporator will remove 10,000 lb. of water per hour from the juice.

Description of Flow

Fresh juice, at 11.3 Brix, enters at the recirculating line near the top of the second-effect steam chest. A system of baffle plates distributes the juice evenly to the tubes, down the walls of which the juice flows. At the bottom of the tube walls, the juice flows into the suction of the centrifugal pump, which forces it back to the top of the steam chest.

Part of the discharge from this second-effect pump is bled over to the tail-pipe of the first-effect steam chest, where it blends with the juice draining down from the first-effect tubes. The amount bled over is controlled so as to maintain this mixture at 50 deg. Brix. Some of this 50 deg. Brix liquid is pumped to the packaging room as the end product of the concentrator.

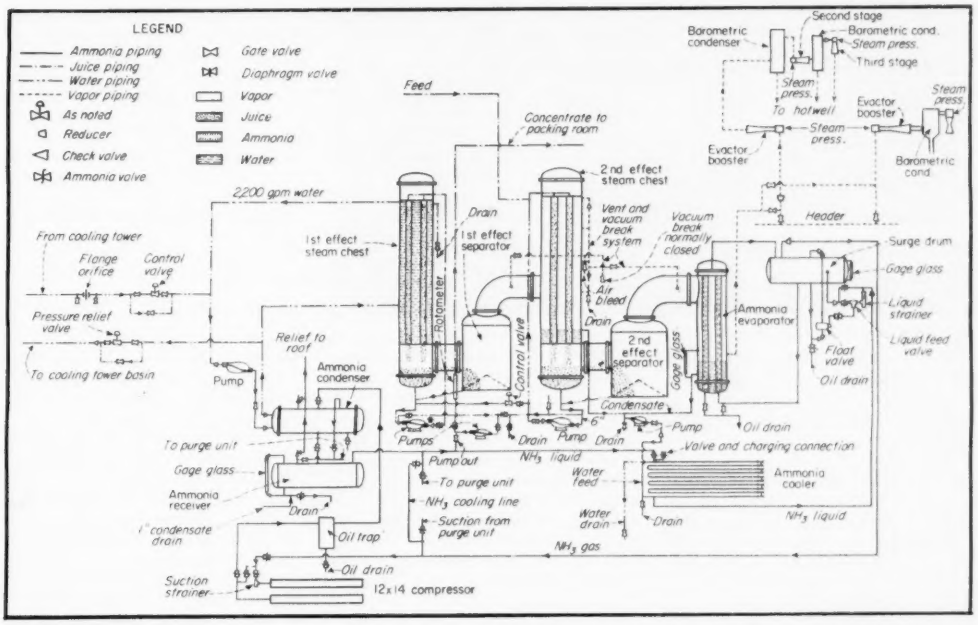
The remainder of the 50 deg. Brix liquid is pumped to the top of the first-effect warm water heat exchanger. The juice then flows down the walls of the tubes into the tail-pipe, where it is blended with liquid from the second effect, and the cycle is completed.

The vapor formed in the first effect passes through a large elbow from the first-effect separator and into the second-effect steam chest, where it gives up heat to the juice in the tubes and is condensed. A condensate drain line leads to the suction of a discharge pump which forces the condensate through the ammonia cooler. There always is some air leakage in the evaporator. Since the air is noncondensable, it is taken out the vent system to the elbow between the second-effect evaporator and the ammonia evaporator and goes to an air ejector.

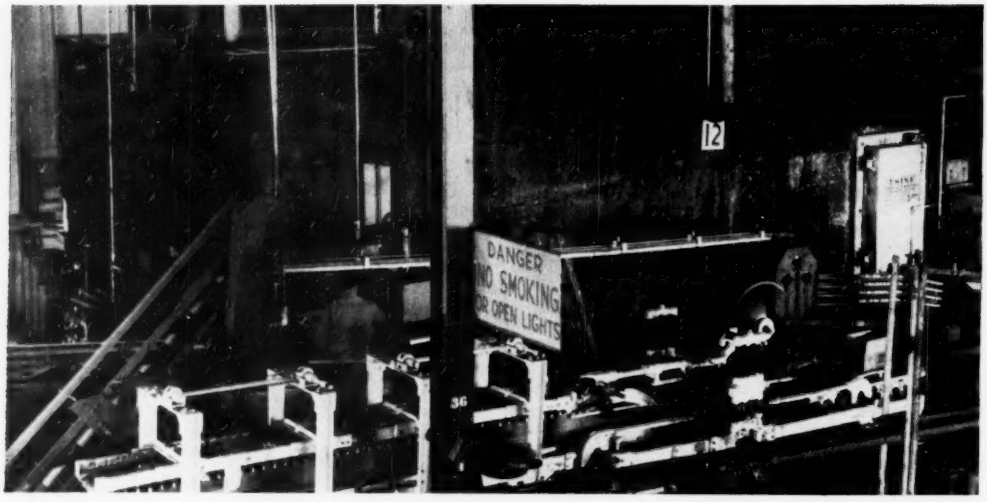
Vapor formed in the second effect passes into the ammonia evaporator, where it is condensed and goes to the same condensate pump as above and on to the ammonia cooler. The air, with some vapor, goes to the air ejector and vents to the hot-well or to atmosphere.

Water and Condensate Flow

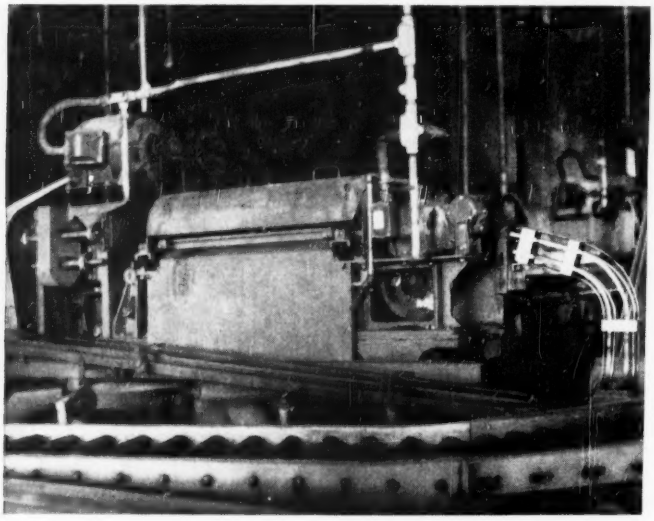
First-effect circulating water passes into the steam chest (which has cross baffles just above the bottom tube sheet) and surrounds the tubes and leaves just below the tube plate. After giving up part of its heat, and thereby having its temperature lowered about 5 deg. F., it passes through a pump to the ammonia condenser. In being condensed, the ammonia gives up heat to this water, and the



JUICE enters second-effect evaporator and concentrate discharges from the first effect in new Buflovak continuous low-temperature evaporator installed by **Minute Maid.** Schematic diagram shows evaporator system and flow.



AFTER concentrate is chilled in Votators and filled into cans, the cans pass through sprays of low-temperature alcohol on walking-beam conveyor for quick freezing. Freezer is adaptation of spray-type bottled beer pasteurizer.



ALCOHOL is removed from cans leaving freezer by a recently developed revolving-brush machine, used in some food plants to clean cans after filling and closing.

water then flows back to the first-effect steam chest.

The temperature of the water is lowered by letting in cool water from a cooling tower and bleeding off hot water to the hot-well. This is done automatically to maintain the desired water temperature and to compensate for the heat of compression.

Water condensate forms in two places—the second-effect steam chest and the ammonia evaporator. It drains to a condensate pump and is transferred to the ammonia cooler, where it is heated as it cools the ammonia. This condensate includes orange oils which were evaporated from the juice along with the water. Since orange juice, as fed to the concentrator, has more oil than is desired in the final product, this removal of oil is beneficial rather than harmful.

Ammonia System

The refrigeration system is fairly typical, except that it forms a part of an almost closed heat-transfer cycle, acting as a heat pump. The compressor suction receives ammonia at about 35 deg. F. and discharges it at over 200 lb. gage. This high-pressure, high-temperature ammonia is cooled and condensed and goes to the receiver.

Between the receiver and the surge drum is an ammonia cooler, of double-wall pipe, where the condensate is used to further cool ammonia. Prior to entering the surge drum, the ammonia is reduced in pressure by an expansion valve. The temperature drops by partial evaporation, and heat for this vaporization is taken from the liquid ammonia.

From the bottom of the surge drum, the liquid ammonia flows to the bottom of the ammonia evaporator (or vapor condenser). Vapor is removed from the top of the surge drum by suction of the compressor, and the cycle is repeated.

Operation of Controls

There are many variables in the operation and these are interrelated so that no one factor can be controlled as if it were isolated. Here are the most important control points:

Juice: Glass ports are installed in the tail-pipes of the steam chests, and the level of the concentrate in these pipes is maintained at a point near the top of the upper-sight glass by a circulating pump. The level in the first-effect concentrator is maintained by adjustment of the valve on the discharge side of the product pump. The level also is influenced by the amount of liquid being bled from the second-effect unit, but this is almost

constant and permits control as indicated above. Control over the level in the second-effect unit is maintained by adjusting the rate of flow of fresh juice into the unit. This is influenced by a bleed-over into the first-effect unit.

Condensate: The level of the condensate is observed at the sight glass on the ammonia evaporator. The level is controlled by adjusting a valve at the condensate discharge outlet of the evaporator.

Product Temperature: Major control over the juice temperature is maintained by varying the temperature of the circulating water in the first effect. After the temperature is set, it is held automatically by a Foxboro M-41 proportional temperature controller. Upon leaving the first effect, the circulating water is returned to the refrigerant system, where a control automatically mixes in some water from a cooling tower to make a constant temperature available to the first-effect evaporator at all times. Variation of this temperature will change the temperature of the product in the second effect, but this temperature is normally well below 75 deg. F. and no harm results. Change of pressure also will change the juice temperature.

Pressure: Under operating conditions, the pressure remains fairly constant. It may be decreased by increasing the refrigerant load and may be increased by the opposite action. Pressure is also increased by venting some air into the system.

Brix: The chief means of controlling Brix is through adjustment of the rate of the feed of liquid from the second to the first effect. Varying rate of discharge from the first effect to the packaging room will also change the Brix. Both variables will affect the level—so they must be balanced.

It is possible to control Brix automatically. Minute Maid's new unit makes use of the boiling-point-rise phenomenon. Briefly, this refers to the fact that the boiling point increases with percent solids or Brix. It also changes with pressure. Since pressure in the system will vary somewhat, there is need to determine the boiling point of water at the pressure of the moment so that this can be compared with the boiling point of the solution.

The difference in temperature can be used as a signal to control an air-operated valve in the liquid line between the two tail-pipes. The more liquid allowed to flow from the second to the first effect, the less the concentration of solids in the first effect and the lower the temperature difference between two points of measurement. If this difference becomes less than that which has been determined as giving 50 deg. Brix at the product pump, the control instrument will partially close the air-operated valve and bring the Brix up to the desired point. If the Brix is too high, the valve will be opened more.

How Evaporator is Cleaned

The evaporator is cleaned at least once a week by flushing out with water, draining and then circulating 500 gal. of hot Citro-clean solution. The unit is then inspected, scrubbed and rinsed with a hose. Next, 500 gal. of cold Diversol solution is circulated, and this is repeated, if necessary. Finally, the evaporator system is again flushed with water.

New Continuous Freezer

A converted walking-beam spray-type beer pasteurizer, the freezer is a high-capacity, continuous machine which requires little labor. The refrigerant is a −30 deg. F. alcohol spray. To avoid wasting the alcohol which adheres to the cans leaving the freezer, the cans are passed through a brushing machine recently developed by Chain-Belt Co. Revolving brushes remove the alcohol from the cans so that it may be reused.

Exacting Quality Control

High production capacity and efficiency is only a part of the achievement at Minute Maid. Perhaps even more important is the rigorous control maintained over the quality of the product. We feel that it is this control that has contributed to placing its product among the best in consumer-preference rating and skyrocketed the company's business during the past few years.

Careful selection of the fruit, close inspection and a double germicidal wash are only the beginning of the quality control operation. The Control Laboratory takes hourly samples of the concentrate and examines these samples for sugar, acid, flavor, aroma, and peel oil. Periodically, the laboratory makes vitamin C determinations. A bacteriologist in the laboratory takes juice samples every hour for bacterial analysis. Yeast and mold are also determined.

These tests are tied up with plant sanitation and serve as a control to assure that equipment is cleaned often and thoroughly. This applies also to the evaporators, since bacterial build-up can occur unless this equipment is cleaned at proper intervals.

Elements of New Evaporator System

Rotameters: These measure juice flow through system.

Steam Chests: Here, heat transfer to juice takes place, as well as evaporation.

Separators: In these, vapor flashes from juice—space inside separators being large enough to prohibit liquid from being carried out with vapors withdrawn by vacuum system.

Vapor Condenser and Ammonia Evaporator: Cold ammonia is passed through tubes surrounded with vapor from second-effect juice evaporator. Vapor condenses and is pumped to waste. Condenser is connected to second-effect separator.

Hogging Jet: Used to reduce pressure in system to operating level with a minimum of time.

Holding System: Maintains operating vacuum and removes non-condensable gases.

Compressor: This refrigerating unit takes ammonia vapor from an ammonia evaporator by way of a surge drum at low temperature and pressure, then compresses it. This increases temperature considerably, and it is at this point that major portion of energy needed to concentrate juice is supplied. Compressor is a Worthington horizontal duplex machine driven by a synchronous motor.

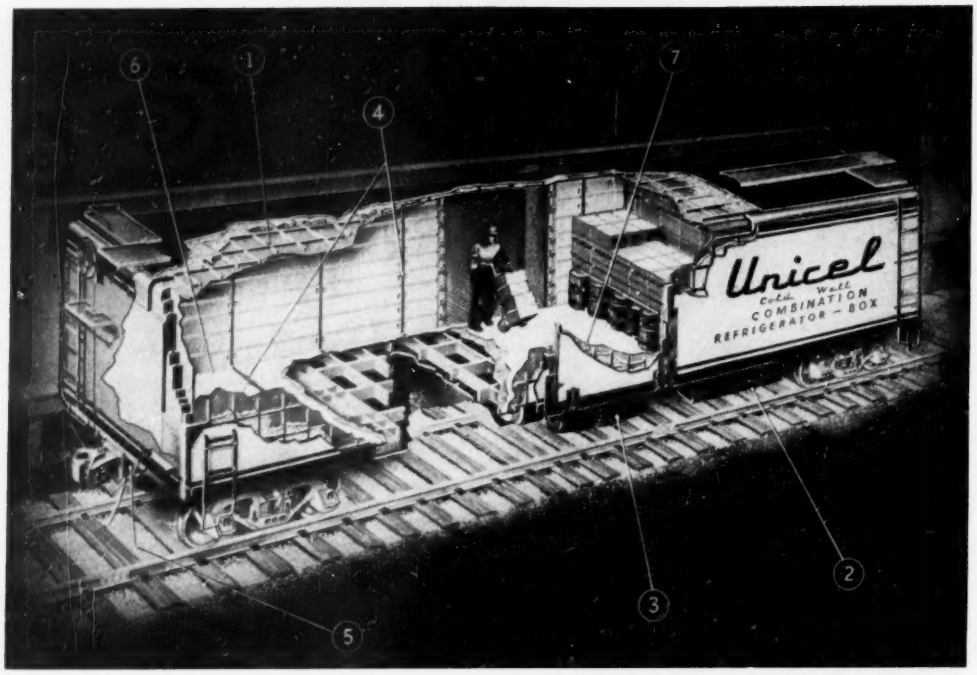
Ammonia Condenser: Heat given up to ammonia by water vapor in ammonia evaporator is in part removed by first-effect circulating water in a condenser. This removal of heat converts ammonia to liquid.

Ammonia Receiver: Liquid ammonia, from condenser, is collected in this unit.

Ammonia Cooler: Additional heat is removed from ammonia by passing it around pipes carrying relatively cool condensate water from ammonia evaporator.

Surge Drum: This acts as storage vessel for ammonia at low pressure and temperature, as well as point where ammonia vapor is separated from liquid ammonia prior to transit to compressor.

7 Notable Features of the New Cold Wall Carrier



CUTAWAY drawing illustrates highlights: (1) Cellular laminated construction, (2) one of two mechanical refrigerators, (3) Diesel power unit, (4) special goods-strapping tie-downs, (5) floating draft sill, (6) wall-floor coving, (7) door-and-floor built flush.

'Uni-Built' Car Has Diesel-Electric Coolers

New carrier designed for uniform refrigeration of foods, bigger payloads, and speedier materials handling. Sanitation reported up, breakage down

FI STAFF

Controlled low temperatures, more shipping space, lower materials handling costs through industrial truck accessibility, reduced breakage in transit with use of a new dunnage device, and improved sanitation. All these features are reported offered in a new, revolutionary, combination freight-refrigerator car equipped with mechanical cooling units.

Called the Unicel, it was developed by the Pressed Steel Car Co., Chicago. Stated to represent the "first major improvement in railroad car construction since 1898", it differs structurally from the conventional cars in that its body is entirely formed of cellular laminates.

Following principles used by engineers in building the Navy's staunch P. T. boats, the new car's floor, ceiling, sides and end walls are molded of tough-but light plywood. Resulting is a unit that, in effect, is a one-piece rectangular tube. And herein lies its unusual strength.

The new car has no center sill (such as employed, ship-keel fashion, to take loads in conventional cars). The Unicel, instead, distributes the stresses and strain throughout its entire body. In contrast, the conventional car carries the weight-stresses of the freight primarily on the car bottom, the sides and top being essentially for enclosure.

Exhaustive tests on the car's strength, load, impact, and thermal characteristics have been made by the Armour Research Institute, Chicago. These performance studies were made in Pressed Steels' laboratory. Copies of all test data, as well as full information on the test procedures, have gone to Association of American Railroads' specialists, who made progress checks at the laboratory.

For thorough tests of the car's ability to hold cold, the company recreated "Death Valley conditions" in its laboratory. Day by day, during a twelve-day period, company engineers first simulated sunrise temperature conditions in the Valley, then gradually increased the heat during the day to an intensity of fully 165 deg. F., and finally matched the temperatures at sunset and during

the night, next day repeating the whole process.

During the entire period, temperature and humidity controls were employed to give the complete story of what was taking place, both inside and outside the car. Inside were various fruits and vegetables, each rigged up with temperature controls so that the engineers could determine any important change. In another room, control panels were set up to make thorough checks on conditions at 40 different points within and outside the car.

At various parts and heights in the car, it was found to have held its cold to a uniform consistency, varying only 2 or 3 deg. F. With a single icing, the car maintained a 10-deg. F. temperature for 9½ days, although it is to be noted that 400-lb. of salt were added each day to compensate for the loss of salt via the brine overflow.

Cold-Wall Construction

Walls and ceiling of the car can be compared to the cold wall of the household refrigerator. In the car structure, the space between two thicknesses of plywood is filled with a new type of silicate insulation—a combed, glass-fiber product called Ultralite. Thickness of the insulating wall is sufficient to keep down heat conductivity to only 0.07 Btu. per hour. Of course, with the special molded plywood construction there are no steel components such as rods, bolts, or nails, extending through the wall to lower insulating efficiency.

Effect of this insulated structure is to create a sealed compartment. Further, the Douglas fir plywood on the interior of the car is coated with plastic to give an unbroken face. Thus there are no laps, seems, or joints through which insects can enter. This type of construction also is reported unusually effective in keeping moisture from filtering into the insulation. And it is a barrier to dust.

There are still other sanitary features: New hinged-steel floor racks make cleaning easier; all corners are rounded; and the flush door-and-floor construction permits fast, effective washing.

Refrigerating unit used is a General Motors Frigidaire Compressor, a model especially made to withstand constant vibration. Degree of cold is adjustable by dial for type of food shipment.

While the car is enroute, the refrigerating unit employs Diesel power. Under full load, hourly fuel consumption of the Diesel unit is approximately 8/10 gal. Storage space for 200 gal. of fuel has been provided. When the car is stationary, or parked at a siding, the cooling unit can be run from an electrical line, a convenient plug-in unit being incorporated. Frigidaire service facilities are available along the rail routes to take care of any emergency repair or maintenance work needed.

Moreover, there is "insurance" in the fact that each car is equipped with two medium-sized cooling units, instead of just one large one. Either of the two units is sufficient to maintain the desired refrigeration in the car in case something goes "haywire" with one.

Car's doors are 8-ft. wide and are of the sliding instead of hinged type. This will permit extensive use of lift trucks and pallets during loading and unloading operations. Thus, savings in materials handling costs are seen.

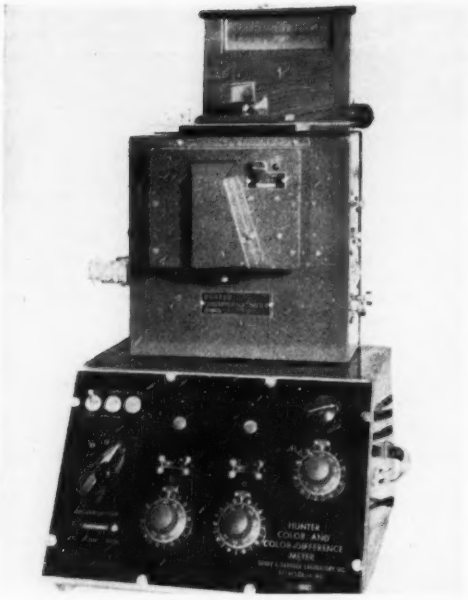
Details on Tie-Downs

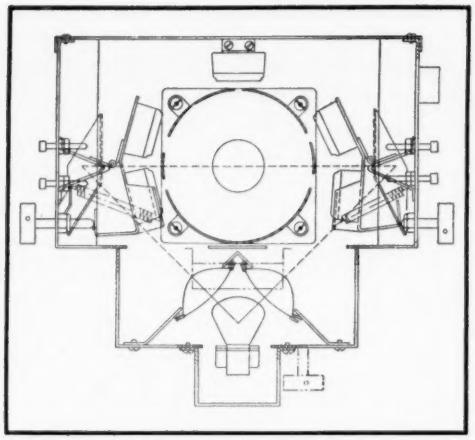
Through the use of a new dunnage development called "Unistrapping"—comprising built-in steel tie-downs—loads can be sectionalized into units that can be readily loaded and unloaded in LCL quantities. The tie-downs adjust quickly and easily at any point in the car and enable loaders to take full advantage of palletizing. Shipments are strapped down securely, eliminating breakage of cartons or contents due to shifting of the load.

Shipping space in the Unicel is greatly increased over that of conventional refrigerating cars, usable volume being upped to 4,080 cu. ft. Inside dimensions of the new car are: Length 49-ft. 6-in., width 8-ft. 9½-in., height 9-ft. 6-in.

Yard Shot Reveals Car's Trim Lines, Extra Length

EXTERIOR view reveals wide, sliding-type door which provides easy access for industrial trucks in loading and unloading operations. Greater car length—in excess of 50-ft. overall, with interior of 49-ft. 6-in.—ups usable volume considerably.





FIGS. 1 & 2. CLOSEUP of test-winning Hunter meter is seen left. Measurements are made by the base component. Exposure unit rests upon it, and at top is galvanometer. Drawing (above) is a horizontal section through the exposure unit, revealing the arrangement of photo-cells, lamp source, and projecting lenses.

This Meter Gives Better Color Evaluations

Careful check of numerous methods for determining tomato juice color shows Hunter color-difference instrument turns in best measurement performance

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Superior objective evaluations of tomato juice color may be obtained with the Hunter color-difference meter, a tristimulus colorimeter measuring color on three scales.

This was evidenced by a series of tests in which the Hunter meter's performance was compared with that of a photovolt reference meter, with several previously reported color measuring methods, and with organoleptic determinations of color. Both experimental and commercial samples of canned tomato juice were checked.

Previous Methods

A number of ways [1, 2, 3, 4, 5] have been developed in the past for making color measurements of tomato products, but none has proved entirely satisfactory. Recently, however, two reflectance instruments became available that showed promise of giving improved objective evaluations. One was the Hunter color-difference meter,[6] and the other the photovolt reflectance meter.[7] (See details in special box on next page.) Results obtained from these instruments may be calculated in terms of tristimulus colorimetry.[8]

Using the experimental and commercial samples of tomato juice, evaluations were made with these two instruments and also with the previously reported methods, and the results were related to organoleptic determinations of color. Thus, performance of the new equipment was gaged.

For experimental studies, samples of tomatoes and tomato juice were prepared from material grown at the University Plant Research Farm. The raw material, treated with different spray schedules, was harvested at weekly intervals during the entire season. The material was then brought into the laboratory, peeled, trimmed and cored in various ways, then canned in accordance with normal practices.

Preliminary results obtained on these samples indicated that the lycopene extraction method[4] was superior to any single determination with the Hunter or photovolt instrument. However, a multiple correlation, utilizing all three values obtained with the Hunter instrument, indicated a better agreement with organoleptic evaluations than the lycopene extraction method.

In general, it appeared that the Hunter "b" value of absence of yellow pigment was the most important factor in the quality evaluation. In contrast, the Hunter "a" value of presence of red pigment was more closely related to lycopene content than the other Hunter values.

In response to requests for samples, 79 commercial tomato juice samples were submitted by 21 firms representing 12 states. Fifteen samples were received after the panel had met and were therefore not included in the studies. A tabulation of the numbers of samples and the state in which they were manufactured follows:

State	Number	State	Number
California	11	New Jersey	8
Delaware	3	New York	7
Illinois	3	Ohio	8
Indiana	7	Pennsylvania	8
Iowa	1	Texas	4
Maryland	12	Utah	7

All of the analyses were made on one can of each sample in order to eliminate any possibility of variance among the cans of the same sample. In addition to a complete analysis of one can of each of 64 different samples, 32 samples were selected at random in order to study the variability among cans of the same sample and to determine the precision of the different methods. Thus a total of 96 items were analyzed.

Panel scores were obtained by averaging the values provided by eight judges who scored each sample on a scale of 1 to 10, with 10 indicating the best color, and 1 the poorest. Official grades were provided by members of the Production & Marketing Administration staff, following the official U. S. method.[9] The color index values were obtained by using the regression formula: 12.6 + .553a — 1.478b, with the "a" and "b" values being the corresponding Hunter values obtained for each sample.

Lycopene values are transmittance readings obtained with the Leitz photoelectric colorimeter using a 490 mμ filter and the extraction method as reported by Kramer, Guyer, and Smith.[8] Hunter color-difference meter readings were obtained by placing 100 ml. of tomato juice in a container 2¼ in. in dia. having a flat plate-glass bottom. The instrument was standardized with a magnesium oxide standard and the three measurements were then obtained.

Hue values were obtained by using the formula: 3b - 15/a, which would provide a value of 1.0 for a hue line as calcuated by Nickerson[10] at a point which would be borderline between grade A and B for raw tomatoes as indicated by Younkin.[11] Thus, values lower than 1 would indicate grade A and values higher than 1 would indicate grade B or poorer.

Results with the photovolt instrument were obtained by using the same sample container. Here, the instrument could not be used when first related with a magnesium oxide standard, hence the following procedure was used: The green tristimulus filter was inserted and the instrument adjusted to a reading of 50 with the tomato standard developed by Younkin.[11] The sample was then placed on the search

Salient Details of the New Gaging Equipment

The Hunter meter measures color on three scales which give uniform values of the visual perceptibility of differences between colors. Photocell windows and the measuring circuits have been selected so that the three values of color are read directly from 10-turn potentiometer rheostats. When these rheostats are set to the values of some standard color and a specimen of somewhat similar color is placed in exposure position, deflections of the current-detecting galvanometer then show the magnitude of the three scales of the color difference between specimens and the standard.

The apparatus is divided into two parts (see Fig. 1). The upper part is the exposure unit containing light source, mounting for test specimens, and means for viewing specimens with different photocells. The lower part is the measuring unit containing potentiometer rheostats, switches, and other components for recording values of photocell current on scales proportional to color.

In the exposure unit (Fig. 2) are an automobile spotlight lamp and lenses and mirrors for projecting two beams of light from this lamp onto the test specimen mounted on top. These beams strike the surface of the specimen from opposite directions along axes that are 45 deg. from perpendicular. A comparison photocell near the source is constantly lighted by it. The current generated by this photocell is taken to the measuring unit, where the various currents from the test cells are compared with it. Because currents from photocells illuminated from a common source are thus inter-compared, change of source intensity does not affect instrument results. However, change of color source that accompanies change of source intensity does affect measured color. It is therefore necessary to operate the lamp from a constant-voltage source.

Light reflected from the test specimen in perpendicular and near-perpendicular directions is measured. A fluted lens is used to collect this light from the specimen and direct it into the diffusing enclosure at the bottom of the exposure unit. This enclosure is lined with magnesium oxide. There are five windows around the wall of this enclosure through which the photocells, covered by filters, receive the light.

In the measuring unit, the test currents obtained from the exposure unit are gaged with three separate 10-turn potentiometer rheostats relative to the current obtained from the constantly illuminated comparison cells.

On the panel of the measurement unit (Fig. 1) are the three potentiometer dials and two polarity switches from which readings are taken. Also, there are the balancing rheostat, galvanometer switch, circuit selector, and instrument control switches. The measurement unit contains a transformer and cables connecting to 110v. a.c. supply to the galvanometer, and to the exposure unit.

The instrument gives three numbers for each color measured. On the right-hand dial is given R_d (45 deg. luminous reflectance). The other two scales measure "a", which is redness when plus, gray when zero, and greenness when minus; and "b", which is yellowness when plus, gray when zero, and blueness when minus.

Photovolt Reflection Meter

For measuring the diffuse reflection of surfaces there is the photovolt reflection meter. Depending on the filters used for the measurements, the instrument furnishes readings of reflectance in specified spectral bands or in terms of total luminous apparent reflectance, or tristimulus values in terms of the ICI Standard Observer for Colorimetry for the purpose of color specification and color matching.

The instrument consists of two parts: The primary unit containing the indicating instrument and controls (Fig. 3), and the "search unit" which comprises the light source and the photocell (Fig. 4). The latter is placed on the surface that is to be measured. It can also be turned so that the sample opening points upward, in which case the sample is placed on top of the unit.

Light strikes the test surface in the normal direction (0 deg.) and is "viewed" at an angular range with an average of about 45 deg. Readings obtained are in close agreement with those of optical arrangements in which the incident light strikes the surface at 45 deg. and in which the reflected light is registered in the normal direction.

The standard search unit contains two photocells—one for measuring and the other the compensator cell. The former is mounted so as to register the light reflected from the surface under test, while the latter faces the lamp and receives the light directly.

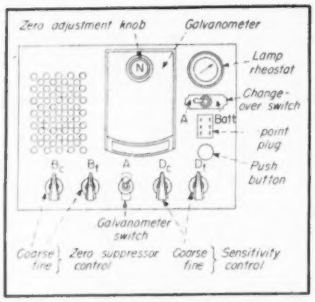
When the unit is to be used for measuring total luminous apparent reflectance, the search unit can be furnished with a green filter consisting of two glasses. This filter makes the response of the photocell equal to the spectral sensitivity of the human eye, and also compensates for the spectral difference between the incandescent light and average daylight. Readings obtained with the filter, therefore, represent what the average observer would consider as "light" and "dark" when viewing the surface under daylight conditions.

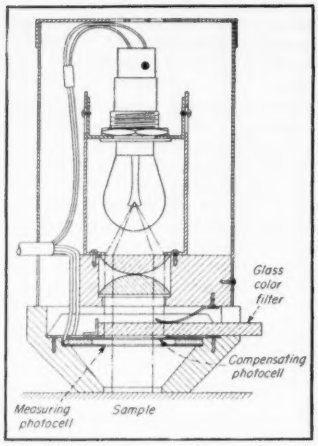
The search unit may also be used with the set of three tristimulus filters. It can then be employed for color specification and color matching. These filters consist of two or more glasses each, and are designed according to data available from the National Bureau of Standards.

On the right-hand side of the indicating galvanometer are provided two knobs for setting the needle in the working position. One of these knobs serves as a coarse control, the other as a fine control.

Two control knobs are mounted on the left-hand side of the panel. When they are turned all the way clockwise, the zero point of the galvanometer scale indicates zero reflection (black). By turning the knobs counter-clockwise, the zero-reflectance point is suppressed. By means of these controls, the instrument can be adjusted to indicate zero for a surface other than black.

Panel Details and Operation Of Photovolt Meter





FIGS. 3 & 4. DEPICTED, left, is Photovolt meter panel. Note indicating galvanometer, control knobs, and the other accessories. Right: Schematic of search unit. After calibration with working standard, it is placed on sample. Then galvanometer needle shows the reflectance value directly.

unit. After a reading was obtained, the green filter was removed and the blue filter inserted and adjusted to a value of 8 with the tomato standard. After the sample was measured again, the blue filter was replaced with the amber filter, the instrument was adjusted with the tomato standard to a reading of 50, and the sample was replaced for the final reading.

The refractive index was obtained with an Abbé refractometer. The data are reported as solids in terms of sucrose as obtained from standard tables and adjusted for temperature.[12] Total solids were obtained by official AOAC methods.[2] Relative viscosity was determined by using a Stormer viscosimeter with a 50 g. weight.

The correlation table summarizes the degree of agreement between the objective methods and the color scores as obtained by the panel and official graders. The correlation coefficient of .841 between the average panel score and the official score shows that there was very good agreement between the organoleptic evaluations. The correlation coefficients (of .75 and .79 between lycopene and panel and official scores, respectively) indicate that the lycopene extraction method is a fairly good objective way of determining color of tomato juice. However, the significantly higher multiple correlation of .904 between the three Hunter color-difference meter readings and panel scores indicates that results obtained with this instrument are notably better than results obtained by the lycopene extraction method, and this latter method is relatively elaborate and time consuming.

Closer analyses of the influence of the three Hunter readings on the overall color values indicated that of the three values, the diffuse reflectance reading (R_d) contributed very little to the accuracy of the method, the significant correlation of −.542 being primarily a result of its high correlation with the "b" values. Thus the multiple correlation between Hunter "a" and "b" values and panel scores was .903—essentially the same as the one utilizing all three Hunter values.

Younkin reported that the grading of raw tomatoes was done entirely on the basis of hue. When the "a" and "b" values were used for the calculation of hue as described above, the correlation between these hue values as obtained with the Hunter instrument and panel grades was −.897, indicating excellent agreement with Younkin's conclusion.

Results with the photovolt instrument also showed that the multiple correlation using all three values gave the best agreement with organoleptic scores. However, the multiple correlation coefficient of .623 and .724 for the panel and official scores, respectively, indicates that the photovolt instrument lacks the precision of the Hunter instrument. Hence, the results, though showing a highly significant agreement with organoleptic scores, are significantly poorer for the purpose of estimating tomato juice color than both the Hunter instrument and the lycopene extraction method.

The relatively low correlations between the total solids or viscosity and organoleptic scores for color indicate that these factors are not necessarily associated with the color of tomato juice.

In order to study the precision, or reproducibility of the various methods, correlation coefficients were calculated between sets of duplicate cans. The degree to which these correlations approach the value of 1.0 indicates their relative precision. These correlation coefficients for individual panel members varied from .49 to .78, and were .87 for the Hunter color-difference meter, .70 for the lycopene test, and .62 for the photovolt reflectance meter.*

It thus appears that the Hunter color-difference meter is a very accurate instrument and that its superiority for the measurement of tomato juice color is due, in part at least, to its

Comparisons Tell the Story

Correlation Coefficients Show How Objective Methods Compare With Organoleptic Evaluations of Tomato Juice Color

	Panel Score (Ave. 8 Judges)	P.M.A. Grade	Color Index
Panel score	...	+.841	...
P.M.A. grade	+.841	...	...
Hunter R_d[1] only	−.542	−.574	...
Hunter a[2] only	+.635	+.591	...
Hunter b[3] only	−.652	−.612	...
Hunter [4]R_d, a,b	.904	.858	...
Hunter [5]a,b	.903	.853	...
Hunter hue[6]	−.897	−.880	...
Photovolt green (g)	−.395	−.433	...
Photovolt amber (a)	−.332	−.377	...
Photovolt blue (b)	−.074	−.050	...
Photovolt[7] g.a.b.	.623	.724	...
Lycopene[8]	−.750	−.792	...
Total solids	....	....	+.145
Viscosity[9]	...	...	−.01

1, 2, 3. Readings obtained with Hunter color-difference meter, denoting primarily: (1) diffuse reflectance; (2) redness; (3) yellowness

4. Multiple correlation involving all three Hunter c-d readings

5. Multiple correlation involving a and b Hunter c-d readings

6. Values for Hue, calculated from a and b Hunter c-d readings by formula, $\frac{3b - 15}{a}$

7. Multiple correlation involving values obtained with Photovolt reflectance meter, using the three tristimulus filters

8. Lycopene as percent transmission, using Leitz photoelectric colorimeter with 490 filter

9. Viscosity as sec. per 100 rev. of Stormer viscosimeter with 50 g. weight

* Color indices were first obtained for the photovolt readings by the use of the regression formula: $8.27 + .532a + .214b - .516g$.

ability to reproduce results with greater precision.

Practical Application

In order to calculate Hunter values in terms of grades or scores, it is necessary to use only the Hunter "a" and "b" values in the regression formula which, on the basis of these samples, was calculated as 12.6 + .553a − 1.478b.

For example, the color index of a sample having an "a" value of 28.5 and a "b" value of 13.3 would be calculated as follows: Score = 12.6 + (.553 × 28.5) − (1.478 × 13.3) = 8.7.

To obtain the U. S. Grade for color, add 20. This gives a grade of 28.7, or 29.

Perhaps a simpler method for practical use would be by reference to a chart, such as is presented in Fig. 5. Referring to the official grades, line A was constructed by selecting the values 24 and 28 for "a" and with the regression formula being equal to 2.5, which was calculated as the equivalent to the dividing line between sub-standard and grade C of the official U. S. grades. Similarly, line B was established by selecting the values of 24 and 33 for "a" and making the regression formula equal 5.5, which is the color index value equivalent to the official dividing line between grade A and C.

Thus, with use of such a chart, the operator need only obtain the Hunter "a" and "b" values and plot them on the chart and see in which category the material falls.

The hue line, as calculated by Nickerson[13], is presented in Fig. 5 as line C. According to Younkin, all values falling on such a hue line should be the same. Using the above multiple regression formula, line D was obtained—a somewhat steeper line—which, though showing close agreement with Younkin's conclusion, would indicate that samples high in "chroma" should rate somewhat better than "hue" alone would indicate.

For Quick Conversions to U. S. Grade

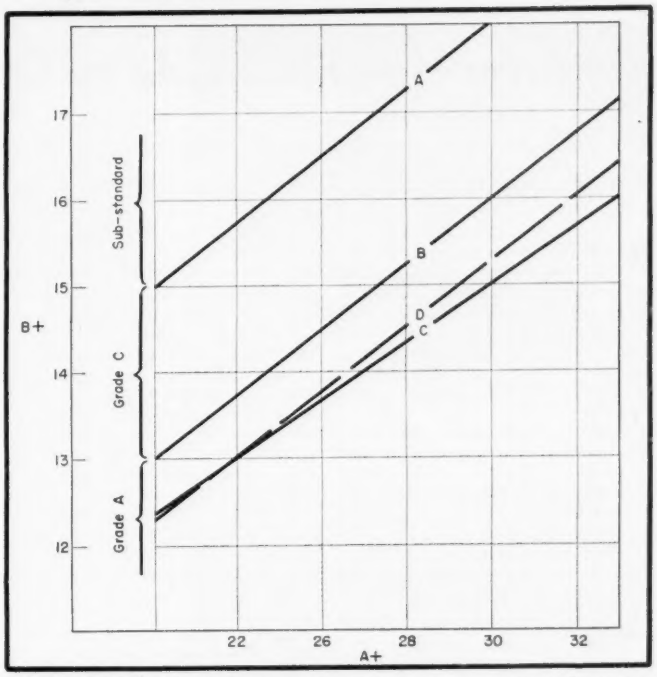


FIG. 5. HERE IS CHART for converting Hunter readings to U. S. Grade for color. Values above line A indicate sub-standard color; between A and B, standard, or Grade C; below B, Fancy or Grade A. Line C is equivalent to "hue" line. Line D is from regression formula 12.6 + .553a —1.478b.

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SPECIAL CARE was taken in evaluating the various methods. Among instruments checked in this research was the Abbe refractometer, seen here being employed to determine the refractive index of canned tomato juice.

Platform Heights Made to Order

Three types of hydraulically operated lifts raise either the platform to meet the tailgate or the truck's floor to meet the platform

REDUCED truck and trailer loading and unloading time, lower costs of in-and-out handling of materials, and fewer accidents in these operations are the notable economies that can be obtained by the use of a new line of hydraulically-operated tilting platforms, ground ramps, and vertical lifts.

They are mechanically, and therefore quickly, adjusted to make the floor or tailgate of the road vehicle exactly level with the platform against which it is backed.

The new equipment takes the place of the old hand-placed loading plates used for many generations in most plants and warehouses for loading and unloading railroad freight cars, trucks and trailers.

Automobile and truck manufacturing plants, notably the Ford Motor Co., and common carrier truck lines have been the first to avail themselves of the money-saving advantages of the new equipment. The former perhaps because of their great familiarity with precision production assembly lines and the latter because their profits and even their existence in business may depend upon how economically they can move goods in and out across their terminal floors.

Wide Usage

But the same equipment has a wide adaptability in the food processing field. There are thousands of food facilities—old, new, and yet-to-be-built plants and cold storage warehouses—that might use one or more of these three different types of platform-truck-leveling equipment to save money.

As is well known, the floor of the vehicle body or tailgate should be level with the loading platform to load and unload a truck most economically. When a new food plant or warehouse is being built, the architects confer with the plant's operating department and decide upon a platform height that will be exactly level with the floors or tailgates of the company's own trucks.

But the concrete of the platform is hardly dry before changes begin to throw the two levels out of balance. These all concern the vehicles that use the platform. The plant or warehouse management has little or no control over such variations.

Suppose, for example, the original platform height is set for a fleet of straight trucks each carrying 8 tons. Next, suppose that the plant or warehouse management discovers that it can reduce the cost per ton hauled by going to tractor-trailers hauling 15 tons or more and accordingly buys units of this type with larger tires and—here's the rub—a different body floor height determined by the construction of the vehicles themselves. Immediately the two levels are out of balance.

Also consider that most food plants and warehouses now get a large percentage of their inbound raw materials by common motor carriers, the floor heights of which differ almost as much as the colors in the sky. These plants also ship out much of their finished products on the same kind of vehicles. Actually, the ground-to-truck bed heights vary between 36 in. and 54 in., even go to 58 in. So the most carefully calculated platform level is bound to be frequently out of balance.

There still are many hundreds of food plants and warehouses in operation today where platforms were designed for solid-tired trucks and hence are at least 1 ft. or more too low for the present-day pneumatic-tired trucks.

In short, with permanent platform heights, it is practically impossible to keep pace with the changes in motor vehicles using them.

But with the adjustable, notched platforms, ground ramps and vertical lifts it is always possible to meet the exact levels. The operator can work to a variance of as much as 24 in. and can even compensate for the difference in heights due to the spring deflection of the vehicle when loaded, partly loaded, or empty.

The leveling equipment is made by the Hoist Division of the Wayne Pump Co., Fort Wayne, Ind. Of the three types offered, the notched platform design comprises an anti-slip, checkered-steel plate hinged to the front of the platform and raised or lowered hydraulically to meet, precisely, the floor of the truck.

The second type is a heavy-duty hydraulic lift installed in the ground directly in front of the platform to raise or lower the rear end of the truck or trailer until it is exactly flush with the platform.

The third type is a conventional hydraulically-operated vertical lift installed flush with the ground and raised and lowered to and from the exact level of the truck and trailer floor. This unit is employed to load and unload where no platform is provided.

Advantages of Each

Each type of leveler has certain distinct advantages, according to the conditions. The notched platform design is used most frequently when the platform is wide or deep, because this type is lower in price and less expensive to install. The hinged plate should be long enough so that the hand truck or fork-lift truck are not "hung up" or unable to negotiate the steepness or angle of inclination of the plate.

Length to specify for the hinged plate varies, therefore, with the height of the platform. A plate 8 ft. long is satisfactory for platform heights of from 44 in. to 48 in. Longer plates are required for lower or higher platforms.

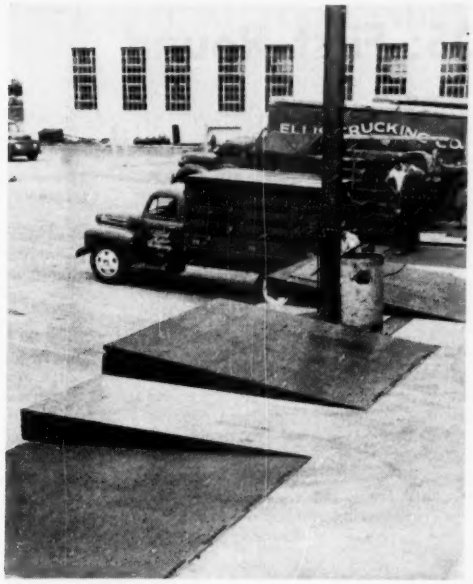
The hinged plate is capable of supporting 15,000 lb. in addition to its own weight. It employs an exceptionally strong piano hinge at the tilting joint. The plate is raised or lowered by means of one full hydraulic cylinder utilizing the plant or warehouse compressed air supply or an electric pumping unit.

A relatively low cylinder air pressure of about 20 lb. is required to lift the plate, since the cylinder is only called upon to raise the plate itself. The cylinder, however, is sturdy enough to support the 15,000 lb. plus the plate weight after adjustment to meet the vehicle floor.

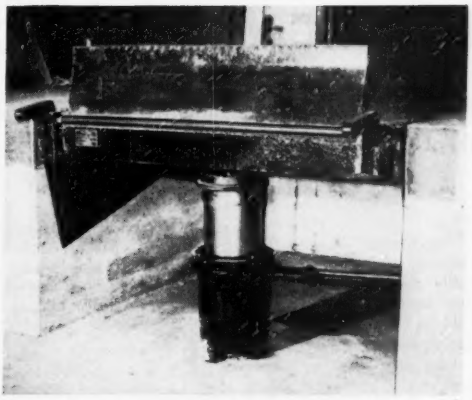
The tilting plates are made in standard sizes—6 ft., 6½ ft., and 7 ft. in width, and in lengths from 6 ft. to 10 ft. Other sizes can be furnished as required. In operation, the plates are adjusted by conveniently

(*Turn to page* 177)

Loading and unloading are "strictly on the level."



NOTCHED tilting plate, at lower left, is depressed to its lowest inclination, plate next is at its highest.



"TRUCK'S EYE VIEW" of notched plate shows throwover plate and arms raised ready for truck to back in.

ANTI-SLIP checkered-steel surfaces on the ground ramps are important when truck must stand on incline.

GROUND RAMP type raises truck floor to platform height, requiring no platform or driveway space when not in use.

VERTICAL LIFT platforms are best for small plants lacking space for a loading platform. Lift itself becomes the platform, the hand-operated control valve lifting or lowering it between ground and truck level. ⟶

CHEMICALS *vs.* FOODS: First Round

Four-day opening session hears evidence to support F&DA request for amendment requiring prior approval for new chemicals used in food products

DR. PAUL B. DUNBAR, commissioner of Food & Drugs, asked revision of the Food, Drug & Cosmetic Act of 1938, during the four day hearing on chemicals in foods held by the House Delaney Committee during September.

One amendment would require prior test and approval of a new chemical before it could be added to any food. The other request was for power of subpoena to compel reluctant witnesses to supply data to F&DA.

Dr. A. J. Carlson, retired physiologist, University of Chicago, felt that use of chemicals in foods would not be objectionable if the chemicals were proved to be not injurious. He would even recommend their employment if the food were "in any way improved" thereby. Toxicity of the chemicals to be used should, he said, be studied extensively before employing such agents in foods, except in those cases where only a negligible amount of toxicity could possibly be in the food.

Smalls Need Help

It was admitted by Dr. Carlson that some of the smaller food producers might need laboratory assistance that they do not now have. Representative McDonough said that there are thousands of commercial laboratories available to the small food manufacturers. But Dr. Carlson pointed out that the cost of such chemical investigations might be more than the small manufacturer could afford.

The "new drug" section of the present law was cited by Dr. Dunbar as an example of what he would like for "new chemicals" proposed for use in foods. He stated that approximately 5,000 new drug applications had been approved from the 7,500 submitted since the law became effective.

A later witness observed that most of the 2,500 unapproved applications were withdrawn by the applicants when F&DA noted that the data were insufficient or that the material was not a new drug. Fewer than 20 of the new-drug applications were formally rejected, while only 8 appeals were made following a rejection, and only 1 had been subjected to court action.

The requested amendments to the law should, according to the Commissioner, include protection against pesticide residues in foods, as well as against deliberately added chemicals, and should also provide for judicial review of F&DA decisions.

Dr. Franklin C. Bing, Chicago consultant in physiology and biochemistry, spoke as chairman of the American Public Health Association's Committee on Chemicals Introduced in Food. He thought that the Food & Drug Law should be amended to prevent incorporation of chemicals in foods before review and approval by F&DA. He felt that such a requirement would stimulate progress in the food industry rather than deter it. Small companies, in his opinion, could join with others of similar size, or work through trade organizations, to keep costs of chemical investigations low.

As these hearings progressed with little evidence submitted by the food industry itself, consensus was that amendments would be forthcoming sharply limiting use of new chemicals in foods.—The Editors

James O. Clarke, head of F&DA's division of program research, introduced into the record a condensed list of 62 "chemicals in foods," which typified the 842 chemicals in the F&DA master list, as yet unpublished. That master list includes chemicals used in the past, chemicals now used, and chemicals "proposed for use in, or on, foods, or in such manner as to constitute potential food contaminants."

Of the 842 chemicals, 704 were thought to be in use at present, and 428 of these were termed "probably safe as normally used."

Dr. Clive M. McCay, professor of nutrition, Cornell University, discussed the long-time attempts to introduce chemicals into foods "in order to make a cheaper product appear like a better one." Use of alum "conditioners" and gypsum "yeast food" in flour today was cited as common practice. He wondered how much of the nation's illness could be ascribed "either to substances introduced into our foods or to essentials that are lacking from our diets." Dr. McCay inplied that use of chemicals in foods might permit a manufacturer to get away with an unsanitary food plant or raw materials.

He also cited his recent work with carbonated beverages, particularly the cola drinks. Erosion of his test animals' teeth was blamed on the phosphoric acid content of the colas. Dr. McCay's recommendations included ten year toxicity studies on chemicals before using them in food. He also felt that the amounts of approved chemicals and other ingredients actually used should be disclosed on the label.

Neutral Chemicals

Dr. Theodore Koppanyi, professor of pharmacology at Georgetown University, pointed out that chemicals occurring naturally in foods may sometimes be harmful, and that synthetic chemicals added to food may sometimes be harmless or even beneficial. He felt, however, that new chemicals should be studied and approved by F&DA prior to their use in any food. Two year chronic-toxicity studies similar to those long recommended by F&DA itself were felt to be adequate.

Dr. Paul A. Neal, chief of the laboratory of physical biology, National Institute of Health, mentioned the need for acute and chronic toxicity data. He also pointed out the necessity for practical analytical tests and careful evaluation of the animal tests as they would relate to humans. He admitted that some pesticides were extremely toxic but should be used anyway, because of their necessity in food production. This calculated risk, he said in answer to Representative Abernethy's question, was one that should be taken, together with adequate precautions to eliminate all possible residues after harvest or processing.

Further hearings by the Committee are expected in late November or early December when Congress returns to Washington. Practically no time to date has been devoted to investigation of the effect of chemical fertilizers on foods and related problems. It is expected also that food and chemical industry spokesmen will later be invited to testify.

A SPECIAL FOOD INDUSTRIES REPORT

FANCY FRUIT are sugar-treated—glaced—in these open steam-jacketed kettles at the Lyons-Magnus plant.

PROCESSING GLACE PEELS

Old Skills Are Now Efficiently Mechanized

Continuous flow operation—almost completely automatic—reduces guesswork, errors, and variations. Employed are liquid-sugar system, novel syrup-circulating unit, and advanced technics that now enable San Francisco firm to speed process, raise output, and cut down on floor-space requirements . . . Allied specialties are also produced

E. E. JACOBS
Production Manager, Lyons-Magnus, Inc., San Francisco

Advanced plant engineering certainly is not limited in its ability to improve and refine food processes. This is being amply demonstrated in Lyons-Magnus' San Francisco plant, where modern technics have now put greater accuracy and efficiency into the making of traditional skilled-labor products—glace citrus peels and other allied fruit specialties.

In France where it originated, the glace process is carried on by highly skilled workers and is considered an

"art." The making of glace fancy fruits is still largely a manual process throughout the industry.

But the processing of glace peel, which constitutes about 50 percent of total output at this plant, is almost wholly mechanized.

In fruit-specialty processing, sugar is an ingredient second in importance to the raw fruit and peels. So, the conversion from use of dry sugar to liquid syrups throughout all manufacturing departments in the 4-story plant has resulted in spectacular savings. Where workmen formerly moved dry sugar by hand truck and on a single freight elevator, pumps now meter liquid syrups cheaply, cleanly, and rapidly into process.

This company, one of the largest manufacturers of glace fruits in the world, started in 1852 as a wholesale liquor dealer and liqueur manufacturer. When prohibition became imminent, a glace fruit expert was imported from France, and the company became the first large western manufacturer of these products.

Under progressive management, a number of other products were added—items that were related to glace fruit inasmuch as they were specialties utilizing sugar or syrup as their principal ingredient. Another reason for taking on the additional items was that these were products sought by glace fruit users or closely related industries.

The company now operates four principal departments: Glace fruit, cherry products, extracts, and soda fountain

Flowsheet Gives Full Picture

All the steps in making the modern glace peel are vividly mapped out in this month's big 4-page picture-flowsheet. And this comprehensive foldout diagram also includes the special operations that supply the allied products—baker's jelly, fountain syrups, maraschino cherries, and toppings. Just turn to pages 106-109.

and bakery supplies. With the exception of Radiant Mix, which is a packaged ingredient for consumer cakebaking, these products are used by bottlers, ice cream manufacturers, bakers, confectioners, and soda fountain suppliers.

Preparing Raw Materials

Fancy apricots, pears, plums, dried prunes, figs, and tangerines from California's orchards; canned pineapple from Hawaii; cherries from California and the Pacific Northwest; and orange, grapefruit and lemon peel (halves) and Zucca melon constitute the major raw materials employed. Citron halves from Italy and Puerto Rico are the only raw materials imported.

All raw fruits receive a preliminary processing prior to water blanching. Treatments differ according to the fruit's cell structure and skin texture and whether they contain pits.

Fresh apricots: Operators first penetrate the flesh at the stem end with a small screwdriver-like device—to turn and break the pit loose from the flesh. The fruit is then stored overnight on trays in a sulphur room. Next day it is boiled, then goes to be glaced.

Pears: Fresh pears are first peeled. Then the same steps are followed as with the apricots.

Prunes: Dried prunes are initially blanched. Pits are removed in the same way as with the apricots. Finally, the prunes go to be glaced.

Tangerines: First, this fruit is stored about 30 days in a 1 percent solution of sulphur dioxide, after which the stem ends are cut out by a specially designed tool. Then, the fruit goes through the boiling and is glaced.

Cherries: Glace cherries are produced from regular brined stock. The fruit is initially stemmed and pitted. (For complete description of handling, see "Processing Maraschino Cherries" later in this report. The only difference in the operation is the higher density of the final syrup of the glace product).

Plums, figs, and canned pineapple receive no preliminary treatment prior to blanching.

Making the Glace Fruit

In years gone by, all of the aforementioned fruits were usually given a final coating or glace, hence the name—"glace fruit." In today's operation, very few of the fruits (at Lyons-Magnus only apricots, pears, and pineapple) are given a glace, and this phase of the operation is rapidly becoming a lost art.

The glace consisted of a supersaturated solution of sucrose and corn syrup in which very minute sugar crystals were induced by stirring. Manipulation of this syrup controlled the size and quantity of crystals. When applied to the fruit under controlled conditions, this syrup gave a transparent, shiny finish.

Fancy fruit and glace peel employing halves are made by the original manual French process. In the manufacture of all glace fruit items, osmosis is the basic principle involved. The raw peel or fruit is first cooked in 300-gal. blanching kettles to tenderize it, break down the cells, and replace the original fruit liquid with water.

Cooking opens a one-way avenue for the osmotic action of the heavier density syrups. During repeated heatings in syrups of increasing densities, fruit cells are penetrated until they are filled with syrup of sufficient density for preservation.

After blanching, the fruit is handled in small lots. It is heated in syrup in 20-gal. steam-jacketed kettles, and then stored between heatings in 10-qt. aluminum pans.

The operator drains the syrup from the pan, ascertains its density with a hydrometer, and adjusts it to the required density by boiling. Heat is then turned off, and the fruit dumped into the hot syrup, where it remains until it reaches the approximate temperature of the liquid. Next, the fruit is dipped from the kettle into a pan and covered with this syrup.

Pans are stacked on pallets and stored in a designated section of the processing area. Here, the product remains in the syrup in open pans, until approximate equilibrium (of syrup densities within and without fruit cells) is established.

A light syrup (20 deg. Brix) is used for the first heating. This process is repeated as many as seven times—the exact number depending upon the kind of fruit or peel. Heating ends with an 80-deg. Brix syrup.

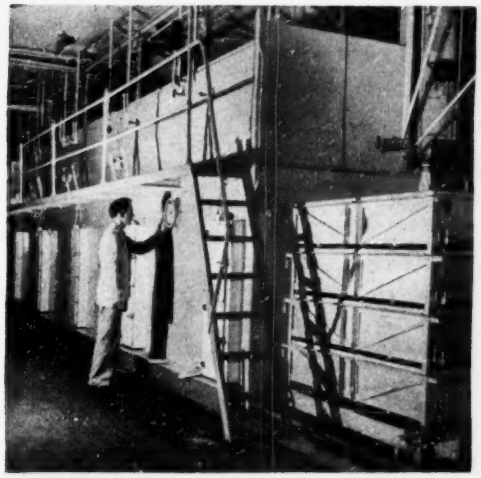
In this, the original method of glace fruit manufacture, the processing time—from water blanch to finished heavy syrup—takes a minimum of three weeks. No artificial preservative is used. The product is preserved by its final high sugar content, usually a minimum of 76 deg. Brix.

Peel Processing Mechanized

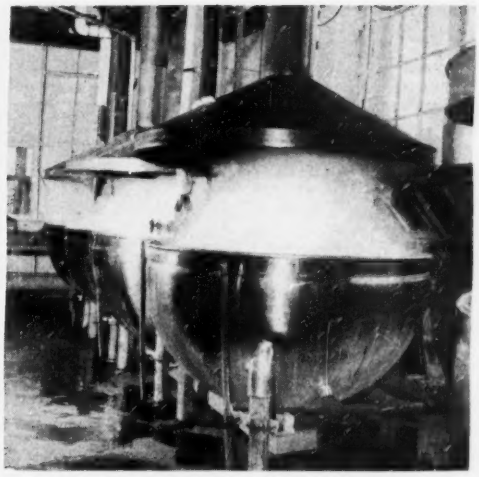
Citrus peels—orange, lemon and grapefruit—are secured from juice plants in California. The extraction or reaming process has removed fruit and juice, leaving the peel halves. These are preserved in barrels containing 1 percent sulphur dioxide brine.

The barrels of peel are automatically dumped on a grading belt, where undesirable products are removed. Next, the peel is conveyed to the dicing machine, where it is cut to $\frac{3}{8}$-in. cubes. A pump now carries the diced product to the washing reel, and in the course of this action most of the ("rag" is removed from inside the peel. At the washing reel, high pressure sprays remove any remaining rag. The peel empties into barrels. Prior to the installation of the dicing-washing units, 30 women were needed

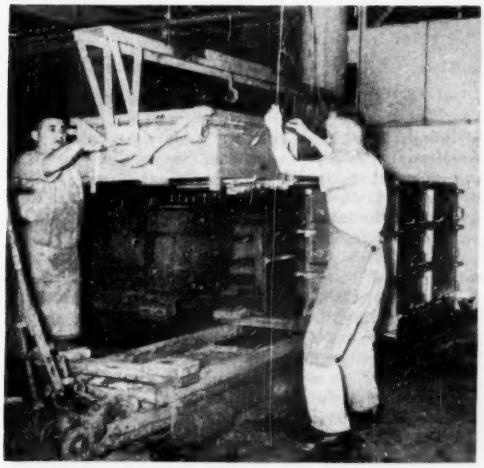
Technics That Speed Output of Glace Peels



INGENIOUS syrup-circulator replaces 20 workers. It does its job in 12 hr. Former manual method took 10 days.



IN THESE 300-gal. blanching kettles, raw fruit and peel are first cooked to tenderize them.



UNLOADED by monorail hoist from car leaving circulator, bins of glace peel are then stacked on pallets.

GLACE FRUIT gets a final wash in these cooking kettles. Washed fruit is then drained on screens.

to remove the rag and wash and dice the peel. The new automatic equipment requires only 2 operators.

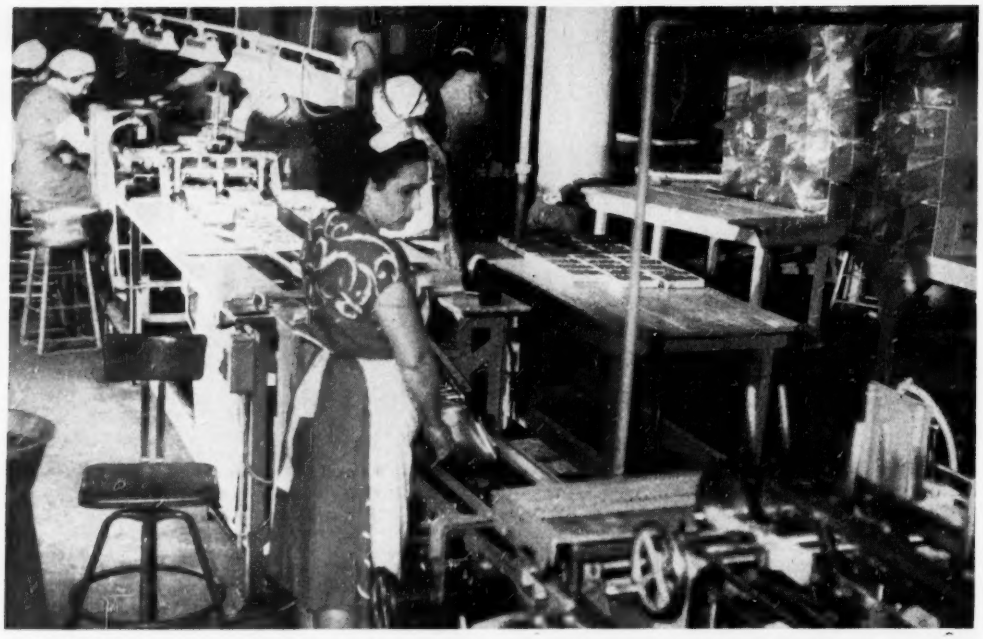
Now, the diced peel is automatically dumped from barrels into steam-jacketed kettles. There are 16 kettles, and each holds 600 lb. of peel submerged in water. Temperature of the water is brought to 212 deg. F. And, according to the kind of peel, the time of cook will vary from one to three hours. Cooking serves a dual purpose: It tenderizes the peel, and it also removes the SO_2.

Two or three water changes may be necessary to reduce the SO_2 content to 10 ppm. or less. Counter-weighted hoods over the kettles have telescope-type vents, and the hoods can be moved out of the way to permit operators to dump barrels. Then the hoods can be brought down over the kettle to remove steam during boiling.

Zucca melons, now grown in California but originally imported from Italy, receive the same boiling process since they, too, are barreled in a sulphur dioxide brine. The melon is purchased in diced form. The cubes are translucent and tasteless. They become an important ingredient for this mixture of peels because they may be brilliantly colored with any of the certified coal tar colors, while coloration of the other products is limited because of natural colors of the peels. Orange peel may be colored red. Grapefruit and lemon peel may be made green or red. These citrus peels may also be used without imitation colors, in this case being permitted to retain their natural shades of orange and yellow.

A semi-automatic process has been developed for diced peels. This method now replaces the small batch process

Mechanized Wrapping Line: Confections Are Shaped Into Packages



PACKAGING is automatic. Mounds of tidbits are neatly compacted into cartons by special rolling device (left).

previously described for fancy fruit. The new system saves the labor of the 20 operators formerly required to manufacture this class of material.

The new process is used to circulate a syrup of continually controlled density through five truck loads of peels. Furthermore, it accomplishes this production in 12 hr., whereas the manual operation took up to 10 days.

New Syrup Circulator

Peels are bailed from the blanching kettles in perforated buckets or colanders and loaded into bins made of corrosion-resistant metal. To each circulator car there are four bins, each holding 300 lb. of peels.

Each bin is separated into four sections by three plates. A space beneath the first and third plates allows the syrup to flow underneath them, then up over the center plate. These separators and a perforated metal cover over each bin keep the peels from floating with the current of the syrup.

At the end of each bin is an overflow from which the syrup from the upper bin flows across the perforated cover and is dispersed into the bin beneath it. The bottom bin discharges syrup into a trough that feeds into a tank below. Cars are moved automatically through the circulator by a finger-link chain.

Filled bins are placed on cars by lift-truck. The peels in each bin are then submerged in a syrup from a supply. This 20-deg. Brix syrup has been circulated through the unit.

After the fruit has remained in this low density syrup for the required time, the liquid is drained from the truck into a trough below, and an operator moves the fruit into the circulator. Simultaneously, a car of finished glace peel goes out the exit side. When loaded, the circulator holds five cars of peel—about 6,000 lb.

Just before a new car is moved into the circulator, syrup is drained from the other cars. As the new car goes in, the other four cars progress to another position nearer the exit. The car nearest the exit is then filled with 80-deg. Brix syrup from the respective tank on the floor above. And each following car is filled with a progressively lighter density syrup from its tank. Syrups drained from the cars flow into tanks on the floor below, where it is pumped to the tank servicing the next car.

Thus, syrup from the car nearest the exit flows by gravity from the first supply tank, through the bins of peel, and into the tank below. Syrup is then pumped to the second supply tank, and it makes the cycle back to third supply tank. Final steps are circulating the syrups through the remaining three tanks.

These supply tanks empty into holding tanks just above the cars, where the syrup density may be adjusted if it is not at the proper Brix. Each tank is equipped with an agitator.

The rate of osmosis of the particular product being processed controls the speed with which the cars move through the tunnel. The temperature of the tunnel is automatically controlled and recorded. It varies with the product and it has an appreciable effect on the rate of osmosis.

The system has an independent gas-fired, automatically controlled boiler that continues to operate efficiently, with respect to temperatures, even though the rest of the plant may be shut down.

Bins are unloaded from cars with monorail hoist, and they are placed on pallets. The finished glace peel, which is still submerged in its final syrup, is now dipped from the bins and drained. Then it is filled into barrels and covered with an 80-deg. Brix syrup. The barrels are headed and the product stored until it is needed by the packaging department.

The syrup densities in finished glace fruits or peels vary

with the product. Densities range up to 78 deg. Brix.

Having been stored in heavy syrup, products finally must go to washing kettles. Here, the heavy syrup is removed from the fruit surfaces in boiling water.

The fruit is then kept in the kettles in the resulting reduced-density syrup only long enough to permit free drainage of the surrounding syrup. Care must be taken not to remove any of the syrup from within the fruit.

Next, the fruit is bailed manually from the kettles and put on screens to drain. Both the diluted syrup in which the products are washed and that which drains from them are recovered, filtered, and pumped to the basement into one of the fruit-syrup storage tanks. This washing step applies both to fruits stored in 10-qt. aluminum dishpans and barrels.

"Radiant Mix"

This special mix, a proprietary brand, is composed of various peels (orange, lemon, grapefruit, and citron), Zucca melon, pineapple, and cherries.

After these ingredients are washed free of heavy syrup and drained, they are dumped onto an inspection table, where any poor quality fruit or extraneous matter is removed. Each ingredient is then weighed into individual batches, according to a definite formula for this mix. Batches are then stacked on pallets and moved to the mixer, where they are dumped from their individual containers and automatically combined into 400-lb. lots.

From the mixer, the mass is automatically poured into a hopper, and from this it is fed onto the filling and check-weighing conveyor. Even though the product has been recently washed of the heavy syrup, it remains very sticky and it must be hand-filled into open-top cartons. After filling, each carton is checkweighed.

Because of its excessive stickiness, operators fill the mix into the cartons in a mound shape. If the filled cartons were not leveled off, no packaging machine could place a neat, desirable looking wrapper around it. So, the conveyor transports the filled cartons under a rolling device which levels off the mounds of product and firmly packs it to fill the carton.

The rolls are kept from sticking to the product by application of an alcoholic extract which seeps slowly onto the rollers from a glass cup above them. Scrapers clean off any fruit which may adhere to the rolls.

Cartons are wrapped in laminated cellophane. The label is printed in reverse on the top lamination. And the second sheet of cellophane protects the products from contact with the printing inks. These consumer-size (1-lb.) packages are then packed 24 to a case.

All of the individual varieties comprising Radiant Mix and the mix itself are also packed for the bakery and confectionery trades, usually in 10 and 25-lb. units. Packing usually consists of a corrugated shipping case with a polyethylene liner. Each liner is heat-sealed to afford maximum product protection until the contents are used by the buyer.

Fancy fruit may also be packed in bulk containers, usually 8 to 10-lb. units. However, the largest sale of this class of glace fruit is in the traditional redwood gift chest.

Making Baker's Jelly

Conventionally, baker's jelly is an imitation product made from a corn syrup base. Here, at Lyons-Magnus, it is made from the syrup in which glace fruit has been processed, and it is a mixture of liquid sugar and corn syrup. Also, it may be assumed that some of the properties of the fruits have been assimilated into these syrups and will be evident in the jelly.

All diluted syrups used in the glace process are recovered, filtered, and concentrated to specified density. Then they are pumped to one of the two fruit syrup holding tanks in the basement. From these tanks, this syrup can be pumped back into any operation desired—including the baker's jelly unit.

Fruit syrup is pumped from the basement tanks to a 500-gal. steam-jacketed kettle equipped with an agitator. Pectin and acid are added to obtain the gel. Color and flavor are mixed into the gel, as required. After proper cooking, it is filled into 30-lb. tins or 500-lb. barrels.

Fountain Syrups

The base of fountain syrup is sucrose. However, certain fountain syrups contain some corn syrup. Extracts and fruit juices are used to obtain the desired flavors and other characteristics.

Some of the base syrups are mixed in one of the tanks in the syrup gallery. Others are prepared in the evaporator department, where flavoring materials and color are added and the product is adjusted to a final Brix. Fountain syrups are then pumped to a holding tank, from which they are filled into cans or gallon jars, labeled, and cased.

All toppings used by bakers and soda fountains are vacuum processed. The sweetening ingredients—liquid sugar and corn syrup—are pumped to a mixer adjacent to the vacuum pan. Fruit and other ingredients are added and the batch is mixed and heated to a sterilization point of about 180 deg. F. The batch is then drawn, by vacuum, into a pan, where it is cooked (temperature and time vary with the product) to its final desired density. Temperatures will average below 130 deg. F., and the vacuum is 28 in. or above. The finished product is then drawn into a holding tank, from which it goes to a can filler.

To move the very viscous batch from the pan to the holding tank, the pan vacuum is broken and the holding tank evacuated. From the tank, the fruit goes through a conventional filler, and cans are labeled and cased.

Chocolate Syrups

All chocolate syrups are suspensions of cocoa in a liquid sugar and corn syrup base. The base syrup is prepared in one of the tanks in the syrup gallery, and it is pumped into the holding tank above the kettles. Cocoa and other ingredients are blended into the syrups with agitators, and the product is cooked—time and temperature depending upon the product. Final density is determined by end use.

After cooking, the product is homogenized, with pressures ranging up to a maximum of 2,000 lb. From the homogenizer, it is pumped to a holding tank, thence to a can filler, seamer, labeler, and caser.

Processing Maraschino Cherries

This company—one of the largest manufacturers of maraschino cherries on the West Coast—has brining stations, under company control, established in cherry-growing districts to guarantee quality of fruit.

In the field, cherries with stems are filled into barrels and covered with 1-percent SO_2 brine. Brined cherries are then shipped to storage at the plant to await processing.

Barreled cherries are automatically poured into a cluster-breaker, which consists of two sets of reciprocating stainless steel wire screens of about 1-in. mesh—large enough for cherries to drop through. Single cherries fall through directly. But as clustered cherries drop through, the action of the two screens breaks the stems apart, and the cherries then fall. They land in a hopper, from which they are elevated to the stemmer.

Stems are removed from the fruit as it rolls down inclined, corrugated, slotted troughs. Located directly below these troughs are parallel rollers—one bronze and the other rubber—which turn in opposite directions. Pusher-belts, with rubber fingers, move the fruit down the troughs, eventually positioning them so that the stems protrude

through the slot, where the two rollers grasp them and pull them from the cherries. Stems are discarded.

Cherries then move across a grading belt, where damaged or poor quality fruit is removed. The good fruit is then elevated to a size grader, where it is separated into four sizes (16 mm. to 22 mm.). Fruit too large to be sized on this rotary grader comes off at the exit and is used for extra fancy glace products.

Cherries Machine-Pitted

The size-graded cherries are bailed from the barrel by hand and fed into the hopper of the pitting machine. The pitter is equipped with a rubber-belt conveyor incorporating individual pockets into which the cherries fall. Each pocket has a hole in its center. As the belt moves the fruit toward the pitting head, the cherries are automatically oriented so that when the pitting tool enters the fruit the pit is forced out its stem end.

The orientating device, a small rotating spindle, enters the pocket through the hole. Because of its size and shape, it will tumble the cherry around as long as it is revolving against a convex surface. As the spindle strikes the concave surface of the stem side of the cherry, it no longer touches the fruit. The cherry remains in this position until it reaches the pitting head. This device operates on an endless belt, located under the rubber conveyor, and it is arranged so that the spindle is withdrawn before the conveyor reaches the pitting head.

The pitting mechanism is composed of twelve knives with 5-pointed ends. These penetrate the cherry and push the pit from the flesh and out of the hole in the bottom of the pocket.

Cherries then pass over a "cherry candler," which reveals any cherries from which pits have not been completely removed. The candler consists of a belt made up of pocketed rubber strips, with a hole at the bottom of each pocket. These strips, forming an endless belt, pass over yellow-green fluorescent light tubes. Cherries with no pits are translucent, but a shadow is cast by a pit remaining in the fruit. Cherries with pits are removed by operators stationed along the sides of the candler.

Pitted fruit is now caught in barrels, and the filled barrels are loaded on pallets. Lift trucks carry them to the cooking department. Barrels are then mechanically dumped into kettles which hold 250 lb. of fruit. Cherries are now boiled with several water changes in the operation in order to tenderize the fruit and to remove the brine to a maximum of 20 ppm. of SO_2.

At this point, certified coal tar colors are introduced to give the characteristic maraschino-cherry color to the bleached fruit. The red color is added to a water solution in which the cherries are soaked at least over night. After pigmentation, the cherries are drained and syrup is added.

By a process approximately the same as that previously described for the manufacture of fancy glace fruit, the syrup concentration is successively brought up to about 40 deg. Brix. This syrup is then drained, and the fruit is packed in its final container. Here, it is covered with a syrup of such density that, when equilibrium is reached, there will be a minimum cutout of 45 deg. Brix. Jars and wooden barrels are the conventional containers used for this product.

Handling Liquid Syrups

Liquid sugar and corn syrup are delivered to the plant by rail cars. The liquid sugar is tailor-made at 74.4 Brix (instead of the usual 67 deg. Brix) standardized at 40 percent invert-sugar level. In addition to being optimum weight for the process, this liquid provides more sugar per delivery. Also, such high density, high invert sugar content syrup is not susceptible to mold and yeast growth.

A 7,000-gal. tank car of liquid sugar may be gravity-drained in less than 2 hr. into a 17,000-gal. stainless steel tank located in the basement. Corn syrup is fed from tank cars to storage tank in about 6 hr.

All piping for liquid syrups is of streamlined copper tubing, with fittings varying in diameter from 4 to 1 in. The system is designed to pump against a 50-psi. head with the pressure switch set at 80 psi., delivering syrup at about 30 psi. With two stations in operation, delivery is at a rate of 45 to 50 gal. per minute. Syrup is used on the 3rd and 4th floors.

The liquid sugar pumping system works from a 3-in. gear pump, operating from a pressure-control switch. Lines to unit operations are ready to deliver syrup instantaneously and, when a valve is opened, the pump is actuated so that the 50-gal. pressure tank is kept constantly full at the required pressure.

Corn syrup, which is stored in a 15,000-gal. tank located in a basement room heated to 100 deg. F., is drawn through a preheater to reduce viscosity and make it easier to pump. Through a bulk handling system, corn syrup is delivered to each of six 1,000-gal. tanks in the central syrup room by gravity through 6-in. lines from a tank located in a penthouse above the 4th floor.

Usually, the processing syrups are blends of liquid sugar, corn syrup, colors, and flavors—the corn syrup being first measured into the blending tanks.

This gallery of six tanks is located on the third floor. Each tank is heated by closed steam coils, and filtered compressed air is used to agitate the mixtures. Liquid sugar is automatically metered into these tanks through a 3-in. line. The metering system and piping are arranged so that delivery of syrups can be made to two tanks simultaneously.

Liquid Sugar Economies

Since syrups of varying densities are continually applied to every product in this plant throughout the whole processing operation, the advantages of using liquid instead of granulated sugar were early apparent.

These advantages fall into five categories: Handling, sanitation, storage space, quality and/or yield control, and economy.

In 1941, when the company used bagged dry sugar exclusively, handling costs on 39,614 bags (3,961,000 lb.) of granulated sugar amounted to about $5,900. In 1948, using liquid sugar, handling costs on an equivalent 3,390,911 lb. of sugar amounted to $108.

Plant sanitation is improved by the closed system of liquid handling. This means no sugar spillage, no rodent contamination or insect infestation.

Storage space is saved by utilization of floor-to-ceiling tanks. This company's 16-ft.-dia. 13-ft. high tank occupies less than one-fourth the area that would be required by sugar stacked five bags high.

Exact control of sugar input, and also yield calculation, is assured by automatic metering of syrups of known densities into process, instead of weighing and dumping of dry sugar.

In addition to the direct or indirect inplant time and labor savings indicated above, liquid sugar provides an initial saving of 15c. a cwt. in the case cost of dry sugar equivalent, made possible by the sugar refiner's reduced costs. Calculations indicated that these savings, combined, would pay off installation costs in one to five years, depending upon volume and class of material used.

Lyons-Magnus' huge stainless steel tank, along with copper tubing and fittings, cost nearly $13,000.

The making of glace fruit remains, in some measure, an "art"; but the guesswork, the possibility of error and variation, as well as dependence upon special labor, skilled and unskilled, have been reduced to a minimum by modern science and engineering.

Testing Is Meticulous in QM's Food Acceptance Laboratories

1 **SAMPLES** are carefully prepared by home economist in spotless laboratory. They go directly into . . .

2 **TURNTABLE** partitions built in opposite wall. And a quick turn then transfers them to the . . .

3 **TESTERS** in individual booths. Note controls (top) to permit color regulation of fluorescent light.

4 **ALL ROOMS** have the air-temperature-humidity units, fluorescent lighting, and sound-deadening ceilings.

How QM Maps the *Food Acceptance* Salient

It has spotted key targets—in acceptability predictions and their validity, tests and their relationships, observing and recording factors. And now, here is the attack—

DAVID R. PERYAM

QM Food & Container Institute for the Armed Forces, Chicago

Determination of the reception of food in actual use—whether by the soldier or the buying public—is the prime objective in food acceptance work.

Flavor measurement in the interests of research is a second purpose.

Yardsticks applicable in both acceptance and flavor evaluations are essential to fulfill these ends. Many problems (see table, next page) are encountered in devising such yardsticks and in using them in food development.

Excessive food wastage and lowered morale caused by relatively nonacceptable foods arose from time to time through World War II, and it became increasingly evident that the elimination of such items from the rations could do much to effect economy and also enhance military efficiency. This called for a more complete evaluation of foods—one which would include the acceptability aspects.

The usual approach to acceptability problems had proved inadequate. It had not kept pace either with the demands of Service feeding or with advances in other areas of food development. Food acceptance had to be established as a separate research and development function. Accordingly it became a part of the food research and development program for the armed forces early in 1945.

No doubt this answer sounds a familiar note to many people in the food industry. It will recall a simi-

These Are Major Objectives on the Food Acceptance Front

There Must be Developed—

1. **Better acceptance predictions and better means of gaging their validity.**
2. **More reliable observing and recording of ration acceptance under use conditions.**
3. **Standard, more specific and reliable methods for acceptance and sensory testing.**
4. **Means of adapting sensory test methods to production quality control.**
5. **Checks of usefulness of consumer preference tests in the laboratory.**
6. **More knowledge of the elements, and their relationships, in the acceptance equation.**
7. **An evaluation of preference in the acceptance equation.**
8. **A measurement of the monotony factor.**
9. **A gage of significance of palatability of emergency rations.**

lar type cause-and-effect sequence encountered in producing for the commercial markets during recent years. It will also be noted throughout this discussion that most food acceptance problems of the armed forces concern industry equally as much.

Food Acceptance Defined

The type of activity that has become known as "food acceptance" has these primary functions:

- **Evaluating end-products.**
- **Serving as an immediate research tool in food problems.**
- **Locating and defining food research tools in food problems.**
- **Obtaining basic knowledge about man's behavior toward food.**

At present, also, a secondary function requires much effort. Acceptance must clear up its own methodological house and learn how to provide information that is more precise and useful. Food acceptance is not as yet recognized as a unified discipline, except in limited circles. It is not a science in itself. It is, rather, an area of interest which cuts across the boundaries of a number of sciences—notably psychology, physiology, and sociology—but it must deal intensively with many a problem in these fields which the mother science touches on but lightly. Hence it has available no ready source of either established methods or operating principles.

This article will deal with *general* rather than *particular* problems of the field. The following are examples of the particular class: (a) To produce a canned meat without the "canned" flavor, (b) to improve the soluble coffee used in rations, and (c) to obtain acceptable dehydrated carrots.

While solution of such problems is vital and their existence is the prime reason for having acceptance work, they are not food acceptance problems. They are, rather, food development problems wherein acceptance is a critical factor. Primary responsibility for their solution lies in the product fields in which they occur.

Many examples have already been given in previous articles in this series on specific food problems of the armed forces, so here we will direct attention to those acceptance problems of general significance.

It's Human Behavior

Does a food have acceptability in the same way it has pH or nutritive value? Many people seem to think so. However, it is really a "must" to understand that acceptability is not a characteristic of food. Also one should understand that food acceptance is not a study of food but of what people do about food. Human behavior is its basic subject matter. Failure to recognize that fact will frequently result in selection of sterile problems or faulty methods and, just as often, occasion faulty interpretation of otherwise adequate results.

When food acceptance is considered as a study of human behavior, it is clearly evident that the acceptability of a particular food will depend upon many factors in addition to those properties intrinsic in the food itself and known through the phenomenon called "flavor." Anyone who works in the field realizes from time to time that these other factors exist, but there is a persistent tendency to regard them as merely irritating sources of error—the "human equation"—obscuring the true acceptance value, when in reality the idea of a single "true" acceptance value is but a convenient myth.

Acceptance research at the QM Food & Container Institute is based directly on the theory that food acceptance is human behavior. The Institute therefore recognizes the potential variety of "other" causes of acceptability, such as the physiological status of the consumer, his mental state, the conditions of consumption, the influence of competing foods, the prejudices and habits of the consumer. This is not all-inclusive, and certainly no single experiment could take all factors into account even if it were. Relative importance of these factors cannot even be estimated accurately, yet a continual awareness of the full extent of the problem is invaluable, both in devising research and interpreting results.

QM Approach Outlined

There are three broad functional divisions of food acceptance work, under cognizance of the Army QM Corps, which are coordinated from the QM Food & Container Institute in Chicago. By far the greatest volume of work is done within the Institute itself, where laboratory facilities are available and a staff of trained personnel representing several scientific fields has been established.

The second division of work has no particular physical location, but is oriented around the function of providing field-test information. Particular items or complete rations are evaluated in the field by tests which vary in type, size, and importance. They require coordinated effort by several divisions of the QM Corps and usually also assistance from other elements of the Army, Navy, or Air Force. The Institute is responsible for proposing tests, designing detailed procedures, and for analyzing data and interpreting results. The actual testing is carried out by trained teams of military personnel from the QM Board, Fort Lee, Va.

The third division of activity is represented by research projects carried on by outside agencies under contract. Universities are the principal contributors, but private research foundations have helped also.

There is a certain pattern of acceptance evaluation which may arise as a new item or ration is developed. Even though it is not immutable, to trace this pattern will be good background for discussion of the problems which are encountered.

A new military requirement, a known deficiency, or just an idea of how improvement of a ration or ration item might be effected, sparks the process. In the initial stages, food technologists in the particular product field have the main responsibility, including that related to sensory properties and acceptance, although they may obtain help on the latter from the Food Acceptance Laboratory.

When an item has emerged in a reasonable form from the "idea" stage, laboratory acceptance evaluation is in order. This is done basically by consumer preference testing, although other types of tests utilizing panels of trained observers may play a part.

The latter are particularly valuable when there are faults to be located and processing or formulary details to work out. This laboratory evaluation and analysis stage interacts with the "idea" stage until an apparently satisfactory level of preference has been reached and storage tests have indicated the required stability of flavor.

Next comes small-scale procurement of the item and field evaluation. Tests are conducted in which Service men use the item, in its proper relation to the rest of a ration, under conditions as nearly like those of actual use as possible. Data are obtained, by the questionnaire technique, about the soldiers' degree of liking for the food and its utility aspects. Observers' reports provide additional information as to actual use and other pertinent aspects of behavior toward the ration.

As stated, these field tests are not standard either as to type or size. They may vary all the way from an engineering test, with no more than 15 subjects, to a "use" test in which several hundred participate. Hence the validity of the information obtained is also variable. When the item is successfully past this stage, it may be recommended for actual use, or it may be procured for a trial use before final decision is made.

It may occur to the reader that an important final stage is omitted from this sequence—that of obtaining information about the item after it is in standard use. This function is served by field observers' reports from the using areas, by tests run from time to time by various branches of the Services, and by the pervasive, but often unreliable, source of information called "common knowledge."

This area needs to be integrated and related to the other acceptance aspects. One result of the present situation is a possible overemphasis on complaints. Another result is delay in getting vital information back to where it can aid further development. It also makes the problem of validation more difficult, as will be discussed.

The Problem of Validity

Obtaining greater validity of acceptance predictions is one of the most serious problems in the field. By far the greatest interest at the present time lies in the testing of specific items or commodities. Each test that is run is a prediction, since all imply speculation about the probable behavior of the many from the responses of the few. One cannot escape the validation problem even in sensory testing at the research level, where intermediate criteria are usually substituted for the consumer response. If these intermediate criteria cannot themselves be validated, research based on them is futile.

Obtaining a valid test result depends on: (1) Selecting the right type of subjects, (2) taking an adequate sample of these subjects, (3) selecting test conditions that will bring about representative behavior, and (4) using a test procedure which will record this behavior without altering it. Perfect prediction of acceptance behavior should result if all four conditions are met.

Some marketing research organizations attempt to do this by taking a scientifically designed sample of consumers who give opinions after using a product in the home. Certain difficulties stand in the way of general use of an approach like this. For example, it is expensive and time-consuming. More pointed difficulties are that the potential consumers are not always known, and that an adequate knowledge of the conditions of use of a product is frequently lacking.

Acceptance work by the armed forces has an advantage here in dealing with a fairly homogeneous group of consumers, and a disadvantage in having to deal with highly variable conditions of use. Questions of test procedure are equally pressing for both armed forces and commercial testing.

The ideal method of sampling actual behavior can seldom be attempted, and the problem becomes one of making reasonable substitutions for both consumers and conditions. To do this in the laboratory, where most acceptance work is carried on, is obviously impossible, and one must set up intermediate criteria on the basis of reasonable assumptions. But no matter how reasonable these assumptions are, there must be reservations in accepting all laboratory predictions until there can be validation by other evidence.

Checking of laboratory results, when done at all, usually proceeds item by item, although the efficient way would be to validate the system itself. Hence, devising methods by which validity of laboratory predictions may be assured, or their validity satisfactorily estimated, is a particularly urgent problem at present, both for the armed forces and for industry.

In the field test stage of the armed forces acceptance program, closer approach can be made to the ideal method of prediction. Test subjects are soldiers whose preferences should be representative of those of the military consumer-at-large, and conditions are established to duplicate as closely as possible those under which the item will be used.

Such tests have greater apparent validity than those of the prior laboratory stage; and in the absence of contradictory evidence, their predictions are assumed correct. Yet in actual practice, they usually represent only a small sampling of consumers. Further, there is potential error in selection of test conditions, and the data are necessarily taken under less controlled conditions than in the laboratory. Consequently, it is again advisable to seek validation of both methods and results.

Final validation of acceptance predictions must be found in actual use. Since here one deals with factual material rather than opinion, such validation might be considered a simple matter. However, the actual accumulation of information presents its own difficulties, particularly for the armed forces.

Commercial Approach Compared

Sales figures can serve as a check on the validity of acceptance predictions made in regard to commercial products. If an item does well on the market, one can assume that any prediction of acceptability was correct. This is over-simplification, of course, since acceptability of the food as such is only one of several factors (advertising, availability, price) that will affect sales. But sales do provide a ready index of the overall result, and industrial testing is done primarily to insure that acceptability of the food will not

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■ **"Does a food have acceptability in the same way it has pH or nutritive value? Many people seem to think so. However, it is really a 'must' to understand that acceptability is not a characteristic of food. Also one should understand that food acceptance is not a study of food but of what people do about food.**

"Human behavior is its basic subject matter. Failure to recognize that fact will frequently result in selection of sterile problems or faulty methods and, just as often, occasion faulty interpretation of otherwise adequate results."

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have an adverse effect on that result.

There is no such ready index of effectiveness for the armed forces. Even though the situation is not clouded by considerations such as price and advertising, the criteria of use or non-use are not sufficient. Often an item may be used because there is no alternative, and the effect of poor acceptability will appear in intangibles, such as lowered morale and reduced efficiency. Gross cases will be revealed by excessive waste; less serious cases by complaints from the men in the field which are funneled back to the responsible sources in a somewhat erratic fashion. In the absence of evidence of such nature on a developed item, it is usually assumed that acceptance is adequate and any predictions thereof were valid.

Planning and making good field observations of actual use of a ration based upon adequate samplings of behavior is no easy task, and the conditions imposed by many military operations may result in serious biases. Hence, the factual base of field observations is not complete assurance that these checkups give the necessary information. Development of more efficient methods in this area is another task which challenges armed forces acceptance research.

Validation by Indirect Methods

Other means of validating predictions are needed, since validation by actual use has its drawbacks, even though end-results must remain the final board of appeal. A number of alternate procedures for estimating validity are available. The reliability of a test result—i.e., its reproducibility—is one argument for its validity. At least, it is a basic requirement, since a test that cannot predict itself cannot hope to predict an external event. Demanding reliability in tests can do much to improve prediction by rejecting some faulty procedures immediately. It is particularly suitable for use in the laboratory, where replication is easy.

A more positive approach is that of checking one type of test against another at the same level, or successive checking of results at one stage by reference to the next. For example, in the Institute's acceptance program, results from trained panels will be checked by laboratory consumer preference tests. And these predictions, in turn will be checked by field tests. Exact correspondence is not expected. Contradictions that may arise are signals for critical review of one or both methods. This practice not only provides data of immediate value, but results in gradual improvement of the evaluation scheme itself.

Opportunities for a thoroughgoing test of predictions of non-acceptability seldom arise either in industry or in the armed forces, because of the almost universal policy to cease testing an item and return it to the laboratory for further work whenever a definitely unfavorable result has appeared. This practice delays the development of validation procedures, but it can hardly be objected to, since it is so highly recommended by the economy of effort which results.

Also, it must be remembered that the basic purpose of acceptance testing is not merely that of developing its own ideal methodology. Since laboratory tests tend to be more discriminating than other types, it is quite possible that this practice has the effect of rejecting many products which might have received satisfactory consumer acceptance. Upon occasion, the development of a ration item for the armed forces will continue because of the item's stability or utility characteristics, despite indications of low acceptance, and this offers the opportunity to check validity of a negative prediction.

The food acceptance field should not be considered unique because of this problem of how to achieve valid measurement. The problem of validity of measurement looms large in all scientific fields. Similar problems have, at some time or other, confronted most research workers. It is especially important in food acceptance now, because the field is new and both theory and procedure are quite incomplete. The armed forces point of view has been discussed both in order to present the problem and to suggest some possible roads to solution. It is, of course, quite possible that approaches not suggested here may be equally, or even more efficient.

Sensory Testing

There is another function of acceptance work which is unqualified by the general validation problem outlined above. This is the function of dealing analytically with the sensory properties of food. The human senses can be used as a research tool for such purposes as measurement of flavor intensity and sensory differences, flavor identification, and flavor analysis. This is strictly a laboratory function and for best results requires the use of trained panels.

This type of work has an important place in armed forces food research, operating in close conjunction with other research areas. It answers questions concerning the effects of formulary or processing variables, the incidence of deterioration, the flavor characteristics of foods, flavor transfer from packaging materials, and many others. Work of this nature is done in many laboratories throughout the country.

Also, a new function for this type of testing is developing, being made possible by recent methodological advances. This is its use for production control of flavor quality. Adaptation of sensory testing technics to quality control problems may become a major line of endeavor for erstwhile pure acceptance workers in the near future. The QM Corps is particularly interested because of the possibility of extending to food procurement the same rigid inspection standards that have become possible for a vast array of other items through statistical quality control.

Sensory testing can be carried out without concern about the general validation problem, because it does not involve prediction of behavioral end-results, but only the description of phenomena immediately at hand. Attainment of reliability and greater precision, also the development of methods for specific purposes, are important in this area.

Another problem lies in the common tendency toward confusion of this pure sensory test function with that of preference prediction. Too many workers fail to differentiate these functions clearly. The most commonly used laboratory method, that of the quality rating scale, encourages this confusion when used, at it often is, where only simple discrimination and not preference prediction is needed. Trained panels can legitimately serve to predict preference through an intermediate criterion called "quality," but this function must be subject to critical checks by consumer preference panels.

Questions of method and procedure arise frequently in connection with acceptance work. In fact, they are of such concern that methodology can be considered a serious problem in its own right. In general, methods

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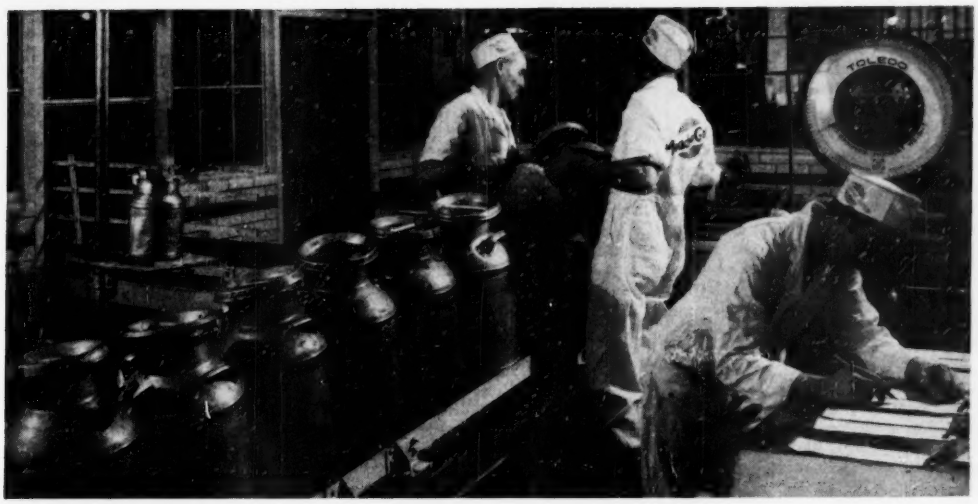
Ties In

All foods developed by and for the QM must be evaluated in terms of their acceptability. And the vital why's and how's are discussed in this ninth article on foods for our fighters—tying in directly with the facts on specific foods revealed in prior articles of this timely series.



IF DEPOSITS form on these cans and equipment, bacteria may be harbored, then spread through the plant.

MILKSTONE: It's Double-Trouble If Not Nipped Fast

Here, causes of the plant-plaguing deposit are spotlighted. Then clear steps are given "to get it to a minimum and to remove the minimum you get"

PERRY E. PIPER
Piper's Dairy Product Co., Effingham, Ill.
Photos courtesy Klenzade Products, Inc.

Formation of milkstone on processing equipment is one of the most persistent problems facing the milk plant operator today.

For, whenever milk is heated, a certain amount of solids are precipitated and deposited on the surface of the equipment.

Unless this milkstone is removed daily it will steadily accumulate—become thicker and thicker, reducing the heating and cooling efficiency of the equipment, harboring heat-loving bacteria, and producing off flavors in the processed milk.

But, by proper procedures, formation of these deposits can be greatly reduced and, as will be discussed below, removal of that which is formed can be decidedly simplified.

What Is Milkstone

Composition of the deposit on dairy equipment has been given considerable study. It can be classified: (1) as a mineral, in which the salts of calcium are quite high; (2) as an organic compound; or (3) as a mineral organic combination. For example, milkstone on plate heaters is often high in organic matter and low in calcium oxide and P_2O_5, while that on coolers may be low in organic matter and high in mineral salts.

Of the many factors that influence the formation and composition of milkstone the following are most important—

1. Temperature and rate of heating. The greater the differential between the milk and heating medium the greater the tendency for milkstone to form. In other words, when milk is heated to 145 deg. F. with water at 155 deg., less deposit will be formed than when a 195-deg. heating medium is used.

2. Rate of flow of milk through the equipment. In general, the faster the flow through a plate or tubular heater the less deposit is formed on the heating surface.

3. Type of product being processed. This influences the composition of the deposit as well as the amount. When cream is processed, the deposit is usually high in fat and much easier to remove than that left by skim milk.

4. Amount of product processed. Vats which are used for pasteurizing several lots of milk have more "burn

How It Builds Up On Exposed Surfaces

CLOSE-UP shows how milkstone will form—layer on layer—when not regularly removed. Proper cleaning will prevent this formation.

on" than those used but once, and the more runs the greater the deposit. In plate pasteurizers this buildup may be of such an extent, during a day's run, that the heating time and flow of milk through the unit are affected.

5. Type of equipment and metal of construction. High-temperature short-time units sustain a deposit different from that on vats. Stainless steel and glass-lined vats, when in good condition, will have less milkstone than chipped glass or tinned copper, where there are rough surfaces.

6. Thoroughness of the cleanup. A poorly washed piece of equipment will retain minute particles of milkstone that may be almost invisible to the naked eye. Hardness of water and the temperature at which it is used also contribute to milkstone formation.

7. Type of cleaning materials employed. Many of the newer washing compounds contain wetting and water conditioning agents that greatly reduce the amount of deposit.

8. Use of softened water or of softening agents. These lower the amount of calcium salts, particularly those which may be combined with the mineral matter from the milk. Installation of a zeolite unit, or similar equipment, for softening at least that part of the water used for cleanup purposes, may be a very profitable investment for the plant operator. For the softened water will require less washing compound and will thus keep down milk and waterstone formations.

Why Objectionable?

Milkstone on dairy equipment is objectionable because—

1. It is an insulator. Even a very thin film on a cooler or vat will greatly decrease the efficiency of the equipment.

2. It is unsightly. Visitors get the impression that, if milkstone is allowed to remain on the equipment, then other undesirable conditions may exist. Moreover, public health officials have long tended toward the same conclusion—that milkstone deposits usually indicate poor housekeeping.

3. It can be the source of high bacteria counts. Organic matter in the milkstone may harbor millions of heat-loving or heat-resistant organisms. And these "pin point" bacteria may seed the milk as it flows through the equipment, lowering quality or actually resulting in spoilage.

4. It is a source of off-flavors and odors. A great many customer complaints on quality and flavor can be traced directly to milkstone deposits on processing equipment.

5. When milkstone is allowed to build up, and to remain over a period of days, there is a tendency for other operations in the plant to be slighted. Certainly, the presence of such deposits does not encourage good workmanship on the part of the men in the plant.

How to Control It

The following three steps are important in milkstone control:

Step 1 is to prevent, as far as possible, its formation. To do this, make sure that the pasteurizing equipment is in good repair and that the milk is not being heated with direct steam. Frequently an operator will use direct steam to speed the heating when, actually, circulation of hot water in the jacket of the vat will be just as fast. Circulating pumps and jets should be checked at regular intervals to make sure you are getting the most efficient and satisfactory operation from them.

In the case of plate units, hot water should not be circulated after the milk is shut off. Internal tubular heaters are particularly susceptible to "burn on," and great care should be taken to prevent this condition.

Step 2 is rinsing the equipment with tepid water as soon as possible after using. This rinse should be thorough enough to remove most of the film from the equipment. Water that is warmer than 120 deg. F. should never be used until all milk solids are removed. Another advantage of the cool water rinse is that it cools the equipment and prevents drying on of any milk that might be left in inaccessible places.

5 Reasons for Getting Rid of It

- **It cuts equipment efficiency**
- **It fosters high bacteria counts**
- **It causes off-flavors and odors**
- **It lowers workers' morale, and**
- **It raises eyebrows of inspectors**

Step 3 is cleaning of equipment—for everyday cleansing is a great factor in control of milkstone. To do a satisfactory job requires a well trained man, a good dairy cleaning agent, correct brushes and methods. The cleaning agent for everyday use should contain a wetting element and a water conditioning chemical. It should also have free rinsing properties. A cleaning agent that tends to leave a film of precipitated solids on the equipment may do more harm than good. Care should be taken that tinned copper surfaces are not marred by metal sponges and other rough treatment.

After the equipment has been scrubbed with cleaning solution it should be well rinsed with hot water to remove the last traces of this solution. Some operators follow this last rinse with a cold one to get a filmless and cloudless surface, especially on stainless steel. This last rinse also removes any of the hard water salts that may have been precipitated by the hot water and which, if left on, could be the base for milkstone deposits.

Great care should be taken to select washing and sterilizing agents that will have no corrosive effect on the metal of the equipment. In this connection it might be worthwhile to review these "don'ts" of cleaning stainless steel, as suggested by the Technical Committee of the Dairy Industry Supply Association:

1. Don't use steel wool.
2. Don't use a water supply containing iron, salt or sulphur.
3. Don't allow chemical sterilizers or cleaners to remain too long on the equipment.
4. Don't let particles of foreign matter adhere to the equipment.
5. Don't permit wrenches, sanitary fittings, or dissimilar metal parts, to lay on stainless steel surfaces which are wet.

Getting Rid of It

When milkstone does appear on the dairy equipment it should be removed at once to prevent buildup. When the surface is wet, milkstone is difficult to see, but when it is dry the deposit is readily visible. However, it can be felt by rubbing the hand or a metal object, such as a coin, over the surface.

When it comes to actual removal, we must divide milkstone deposits into two classes: (1) Those that are the result of poor cleaning and which are of long standing, and (2) those that are formed daily by large amounts of milk being heated or cooled in limited space.

The first type can be removed with acid base cleaners that possess great penetrating and wetting ability, and which can get under the stone and separate it from the surface of the equipment. There are several products on the market, both in powder and liquid form, that will do a good job if the directions of the manufacturer are followed to the letter.

These products may be used in two ways: First, a hot solution of the milkstone remover can be made up and circulated over and through the equipment for a period of time—from 15 min. to several hours, depending upon the degree of deposit. Following this, a solution of general-purpose cleaner is circulated, then the equipment is brushed by hand and rinsed, first with hot and then cold water. In this way the deposit is softened and loosened. What is not removed by circulating the solutions is removed by the hand brushing. When it is not

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We Think . . .

■ Chemical Hearing Mixes Sense and Sensationalism

The Congressional hearing on chemical additions to food quickly spotlighted some of the major problems which the food industries must face and solve.

Two were clearly defined by Dr. Paul B. Dunbar, Commissioner of Food & Drugs, in his request for two basic amendments to the Food & Drug Law. He asked that Congress provide for the control of chemicals in foods by a section on "new chemicals" analogous to the present provision for control of "new drugs." Second, he requested the power of subpoena to bring in reluctant witnesses with all the evidence which they are supposed to be able to furnish.

A third problem was brought out both by government testimony and by the comments of independent scientists. It involves the question as to whether food processors have added new chemicals to foods without proper evaluation of public safety and dietary factors.

Some of this testimony was constructive and given on a wholly professional plane. Other statements represented extravagant claims or conclusions which were discredited on the basis of the presentation itself.

It seems that thoughtless development of chemical additions to food may occasionally occur. And there is no doubt that F&DA should have authority to deal promptly and effectively with such cases.

But most food companies are keenly aware of their public responsibility. And we believe that a much less drastic provision than was first suggested by Dr. Dunbar would be sufficient.

It would be reasonable to require that novel chemical usage be reported to F&DA, and that this agency have the opportunity to investigate and the authority to veto proposals. This would not require an elaborate formal procedure, except in a very few cases where there may be controversy as to the propriety of a new proposal.

We also question the necessity and advisability of broad subpoena power for the Commissioner. We would gladly entrust such authority to Dr. Dunbar and to Deputy Commissioner Charles W. Crawford. But the men who hold their positions in the future may not be so capable and conscientious.

It would be quite adequate and much safer if the Commissioner were merely authorized to request subpoenas on his behalf from any appropriate Federal Court. A reasonable judge would grant needed subpoenas, but would deny those which might authorize mere fishing expeditions.

However, the most disturbing element of the initial proceedings has nothing to do with F&DA. We refer to alarmist remarks by experts. Among the nutritionists' statements were some which would imply that dangerous chemicals are greatly shortening the life span of the average American. In another case one is led to believe that a carbonated beverage is highly destructive to the teeth. Common knowledge refutes both implications.

The alarmist attitude taken by some of these experts needlessly misleads the public and encourages demagogery in official life. It is to be hoped that such sensational tactics will not be followed by any future witness.

■ Selective Service Chart Will Help Solve Personnel Problem

Plant managers who have not already done so should determine the possible effect upon their working forces of the Selective Service program for expansion of the armed forces. Then they should lay plans to obtain and train the necessary replacements. The worsening of an already tight labor situation makes this imperative, especially in an industry where average hourly rates are below those in factories of the type that will be booming with war production.

To help you in evaluating your manpower situation, we suggest that you obtain a copy of Selective Service System Form No. 170, available from the Superintendent of Documents, Government Printing Office, Washington, D. C. This form is designed to enable employers to set down in numbers, according to degree of skill possessed, the male personnel employed—with the number distributed by ages in the order of probable liability for military service.

The chart has columns in which to list number of workers at each age from 18 to 35 and a final column for ages 36 to 65. First call, of course, is for the 19 to 25 age group. But 18-year-olds and those from 26 to 35 are likely to be liable for military service in an emergency, in the order of age.

By using this chart, or a similar one which you draw up yourself, you can evaluate your employment problem under present draft requirements and also under an all-out military situation.

And the chart tips you off to the wisdom of hiring people in the 36 to 65 age bracket, or older, as well as preparing to train and use older women workers and handicapped men.

■ Sound Program for Utilization of Technical Men Essential

It is well-known that no sound program for effective utilization of scientific personnel was developed in World War II—nor does one exist up to this time. It would have been invaluable to have had such a program in the last war. And it is even more important that one be set up for the current mobilization effort.

It is more important now because the only way to prevent serious shortages and disastrous inflation while rearming is to step up industrial production enough to meet high-level civilian needs while increasing output for the military program.

If this important dual job of production is to be done, technical men will have to play a major part in it. Only they can supply the engineering and scientific know-how to achieve industrial acceleration in the face of manpower and materials shortages. At the same time, the growing

armed forces will require the services of many technical people.

American Chemical Society at its September meeting passed a resolution calling upon President Truman to act at once to prevent waste of scientific manpower in the present emergency. And the resolution suggested that the ACS board of directors invite other scientific organizations to help form a committee to cooperate with the government in establishing a program for training and use of scientific personnel. This is a constructive move and should be carried to a successful conclusion.

But as far as food technologists and engineers are concerned, something even more fundamental needs to be done. They need to be spotted by a survey and their special qualifications listed.

The so-called Roster of Scientific Specialized Personnel of World War II was very deficient in respect to information on technical food men. And now that a new Roster is being prepared by the Office of Education, Federal Security Agency, Washington, D. C., the deficiency should be corrected. We have called this to the attention of James C. O'Brien, who heads the project, and have his assurance that proper attention will be given to food technologists. Also, the Institute of Food Technologists has appointed a committee headed by B. S. Clark, of American Can Co., to do something about it.

No one expects blanket draft deferment of technical men. But the country has a right to expect that such men will be properly listed and classified so that their talents may be utilized where they will do the most good.

■ Better Lay Plans for Possible Shift in Packaging

As indicated previously in our editorial columns, packaging problems will be one of the major headaches suffered by food processors as a result of the defense program. While the packaging materials situation is not nearly so severe as in World War II, shortages already are driving many purchasing agents to distraction and are worrying executives, technologists and production men in food plants. As one PA put it: "During World War II the purchasing job was easy compared to now. At least we knew what was available. Today we don't even know what or how much is available, nor where it is located."

Not only is the packaging of food and other consumer products coming into a period of austerity as mobilization picks up momentum, but packaging material prices are rising. These two trends mean that some food processors may have to sacrifice package glamor—or appearance and convenience—and settle for containers or wrappers which are available and will get the product to the housewife in good condition. And there is little doubt that the trend toward prepackaging of meats, produce, cheese and other foods for self-service will receive a setback.

There is no indication as yet that essential food containers, particularly tin cans for fruits, vegetables and meats, will not be available in sufficient quantity. But products such as coffee, beer, lard, candy, nuts, French fries and pet foods may be forced into glass, fiber or flexible containers. This is on the assumption that a current version of the old M-81 restriction will go into effect.

While there is a sizable stockpile of tin, steel is tight and will get tighter even though steel production may be increased as much as 10,000,000 tons in the next two years. When the effects of the soda ash strike have passed, it is believed that the output of glass containers can be increased nearly 40 percent, and, of course, little glass will be used for military purposes.

Plastic films, particularly polyethylene, are in demand for packaging many items for the armed forces because of resistance to wide temperature extremes and good moisture-vapor transfer resistance. Polystyrene used for molded plastic containers, likewise has wide usage in military items.

Industry doesn't like controls. But if allocations are necessary to solve packaging materials problems, then they should be established and food processors should accept them willingly. But it is to be hoped that Washington will take advantage of the lessons learned in the last war in respect to procedures and also that men who had World War II experience in such matters will be utilized. That may be too much to expect of politicians, though some thinking in that direction is evident.

Meanwhile, food processors should continue their individual plans for shifting from scarce to available packaging materials as the situation demands.

■ Ideas Come From Unexpected Places—So Keep The Door Open

Worthwhile new ideas are rare and priceless things. You can't mine, grow or manufacture them on a systematic basis. They often just sort of flash into the mind, and they are not limited to any particular type of mind. New ideas and suggestions which ring the bell come from unexpected places so frequently as to prove the merit of tapping all posible sources.

Let's take a couple of examples: Most people in the food industry are familiar with the origin of the Brown-'n-Serve roll. It was an accidental discovery in a one-man Florida bakery. Perhaps not so many know how canned beer started. James A. Stewart, vice-president of American Can Co., explained this at a meting of Industrial Research Institute.

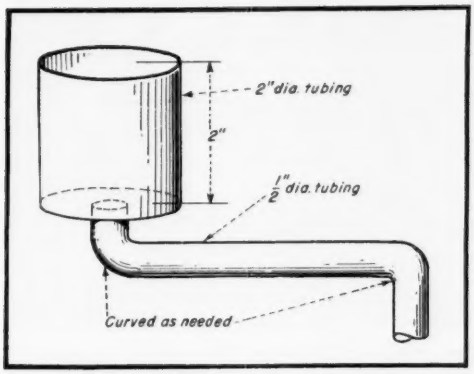
The idea came from a worried salesman. In this salesman's district there was only one good market for cans—malt syrup containers sold to large brewers supplying the makings for home brew. And with the demise of Prohibition imminent, that market was about to vanish. While analyzing his dreary sa'es prospects, the salesman suddenly wondered why the beer itself couldn't be packed in tin cans.

His idea went to the laboratory, and after four years of intensive work, the container was ready for market-testing. You know the rest of this big success story.

The beer can case and other experiences in his career have brought Mr. Stewart to this conclusion: A company does an adequate job of new market and development search only when it solicits ideas from its entire organization. So a food firm not only should have a department or committee responsible for continuous search, but it should encourage every employee—even suppliers and outside contacts—to submit ideas for appraisal.

When a suggestion is made, don't ridicule it, even if it isn't good. Next time the same individual may have one that will pay off. And don't ignore unknowns who think they have something. We know of two currently "hot" new food products which would have walked out the door had the receptionist been told to apply the brush-off technic.

PRACTICAL IDEAS



Device Simplifies Oil Refilling

Through use of a simple, easily made device, the gasoline motor driving the compressor on refrigerated trucks can more readily be refilled with oil.

Because of the compactness of the refrigerating equipment, the oil plug is generally in cramped quarters. Hence spilling of oil when refilling the motor crankcase is common.

American Manufacturing Co., Montgomery, Ala., has now solved this problem by making an oil funnel from remnants of 2-in. copper tubing salvaged from a heat exchanger. Here are the details:

A piece of tubing about 2-in. is cut. On one end is soldered a circular piece of copper sheet. In the center of the sheet a ⅜ to ½ in. hole is cut, and here a length of ½-in. copper tubing is soldered. The smaller, or outlet, tubing is curved to fit around obstructions.—*E. Dalton White, Atlanta, Ga.*

$25 EXTRA FOR BEST ITEM

You are invited to submit Practical Ideas. You will be paid at regular rates when your item is printed and if it is judged best for the month you will get an additional payment of $25.

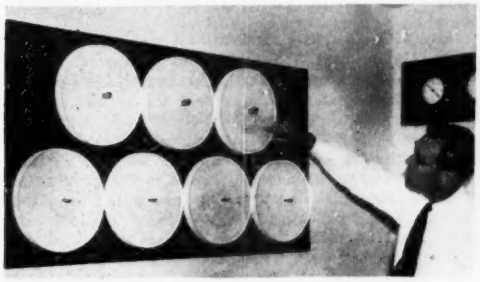
Selection of the best contributed item will be made by a group of 200 readers each month, and the item title and author's name will be cited (see below).

Practical Ideas may describe any type of device or method recently developed to solve a problem, speed an operation, or make some task easier. They may concern factory, laboratory, warehouse, or power-plant operations in the food industry. Ideas on management, maintenance, and trucking or shipping also are suitable.

You need not be an experienced writer or draftsman to submit these ideas. The text will be edited and sketches converted to finished drawings.

Send your items to: Practical Ideas Editor, FOOD INDUSTRIES, 330 W. 42nd St., New York 18, N. Y.

SEPTEMBER PRACTICAL IDEA voted best by our readers was "A Little Tape Makes a Big Saving." This item was submitted by C. Edgar Johnson, president of Johnson Foods, Inc., Oshkosh, Wis.

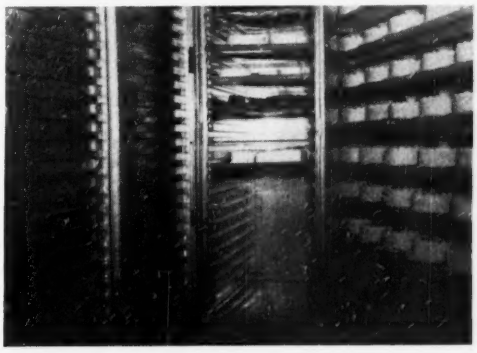


Racks Disk-Charts for Easy Reading

Charts from recording instruments are neatly and systematically "filed" on a peg-board for quick reference at Fuchs Baking Co., South Miami, Fla.

Mounted on one wall of the plant superintendent's office, the handy peg-board consists of a plywood panel with molding around the edges and wooden and aluminum pegs inserted in holes in the board and extending far enough to hold several charts. Pegs are arranged in two rows.

Lucite disks, ¼-in. thick, are placed on the pegs in front of the charts—to hold the paper disks in place. And the advantage of using the transparent plastic for this purpose is that the plant officials can read the top chart through this holding disk.



Distribution System Pays Off

Sanitation and sales appeal are improved also servicing time is reduced, by a unique method of distributing baked products from a central bakery to retail supermarkets.

The system uses tight-sealing individual aluminum cabinets, mounted on rollers, and a special form of truck body. It was developed by E. Gonzales, bakery department supervisor for Miller Supermarkets, Denver retail foodstore chain.

Miller, like many other bakery operators, had experienced difficulties in maintaining appearance and sanitation of baked goods delivered to busy supermarkets. This

problem, particularly serious with cakes, pies, tarts and iced seasonal specialties, has now been solved.

The new cabinets, seen in the accompanying photo, stand 6 ft. high and are 3 ft. deep by approximately 2¼ ft. wide. Constructed of heavy 16 gage aluminum, each contains 24 pan rack slots, permitting versatility in making up the load.

The company uses 200 cabinets, which travel back and forth between the 17 retail stores and the central bakery on a "shuttle system". A fleet of trucks drops newly-filled sealed cabinets at each retail bakery, meanwhile picking up the empty containers from the previous day's load.

The 16 ft. vans have been altered by installation of an electrically-powered elevator tailgate, designed to hold four cabinets simultaneously. Loaded, the trucks accommodate 32 cabinets. These fit snugly into place, to guard against lateral movement and shocks, which would break down delicate decorations or portions of newly-baked cakes.

Making only one delivery per day, the cabinets are arranged in sequence, so that as the trucks reach each successive retail bakery, the row of cabinets nearest the tailgate is dropped off. The driver can quickly push four cabinets onto the elevator tailgate, swing them gently to the sidewalk, and roll them into the store. Here they are immediately opened, and the baked goods transferred to display cases. Empties, as picked up, move down one side of the van, while the filled cabinets come up the other.

Advantages are manifold. There is realized approximately a one-third savings in time of servicing each of the bakeries, and there has been no loss, either from an appearance standpoint or in actual damage in delivering from three to ten cabinets per store.

Further, the heavy-weight aluminum cabinets make a favorable impression upon shoppers in the store.

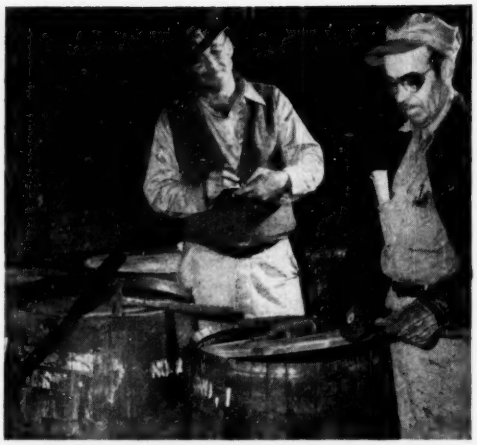
Although the cabinets were termed "highly expensive," the company believes they will soon pay their cost in eliminating losses in distribution.—*Robert A. Latimer, Denver.*

Projecting Base Guards Walls

Glazed tile walls are successfully protected against lift-truck damage by a concrete wall-guard, installed in the new plant of General Foods Corp., Maxwell House Div., San Leandro, Calif.

Triangular in shape, the guard projects about 14-in. from the wall at its base and is about 24 in. high. Installed with the walls after the concrete floors were completed, it is fixed to the floors with steel dowels. In case of building alterations, both walls and guard may be removed without marring the building's floors.

It also provides a sanitary aid, since the old sharp corner angle between walls and floor has been eliminated by an intersection that can be cleaned faster and easier.



Saved—Cash on the Barrel Head

Through use of Neoprene-treated paper slip-on barrel covers, DuPont will effect an annual saving of $50,000 to $100,000 in its huge plant at Deepwater, N. J., alone.

A transport foreman came up with this economical way to cover barrels.

In first photo (see above) a Deepwater plant workman is seen fitting a conventional wooden head to a barrel containing a chemical that will be used in the manufacture of other chemicals. Such barrels are widely employed for storage and for shipping intermediates from one area of the plant to another, and they all must be covered.

The plant had been using wooden heads for barrels, metal lids for drums. A recent survey of only part of such intraplant shipping showed that these covers were costing over $170,000 a year—half of this amount going to replace damaged heads and lids, and half for labor to put the covers on, remove them, wash them, and repair damage (to barrels, and to workmen, too) in getting the things on and off.

George Krough, narrow-gage transport foreman at the Deepwater plant, hit on the idea of a slip-on barrel cover resembling those used over food bowls in the home refrigerator. Possibly a barrel cover could be made from a sheet of plastic, or some cheaper material, with a strip of elastic sewed into the edge.

Several materials were considered, including oiled paper, plastics, and rubber sheeting, but the sucessful candidate proved to be Neoprene-treated paper—a recently developed product in the field of specialty papers.

This new material is produced through treatment of the paper pulp during the beating operation. Relatively small amounts of a special type of Neoprene Latex are added at this stage, resulting in a paper having an unusually high wet strength, exceptional acid resistance, and increased toughness.

Plant tests showed that the new material was just what was needed for the drum cover.

In our second photo, two of the new covers are seen successfully undergoing a practical test in a pouring rain.

The new covers have proved entirely reliable under actual conditions of handling and shipping around the plant. Covers pictured were made by workers in the plant's canvas shop. From a sheet of the Neoprene-treated paper they cut out the top and the side strip, stitched them together, and sewed a piece of elastic rubber into the edge.

Since then, several paper manufacturers have developed commercial production methods and believe that a price under 20c. each is possible when the covers are made in reasonable volume (compared to an average of 51c. apiece for barrel heads).

At that price the company believes it can throw the covers away after one trip and still save money, because these covers are so easy to put on and off—virtually no labor, no damaged barrels, no hammered fingers, no washings between trips.—*From house organ of E. I. du Pont de Nemours & Co., Deepwater, N. J.*

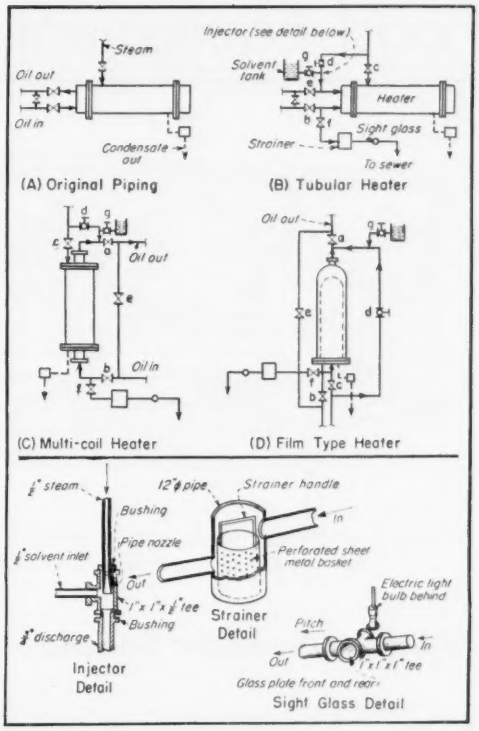
Strategic Use of Grating Saves Floors

Chipping and cracking of masonry floors is avoided in the Zion National Kosher Sausage Factory, New York City, through use of steel subway-type grating encased in concrete at spots where impact loads are likely to be high.

Flooring throughout the plant consists of a structural concrete slab with an attractive red brick surface. The bricks are grooved and have been hardened to give a stronger wearing surface. Further, the grooving provides good footing for the workmen when the floor is wet.

However, impact from heavy loads will chip the floor. To avoid this damage, in locations where impact loads might occur, such as coming off elevators, and over door ledges, the bricks have been replaced by the steel subway grating. Square sections having sides the same size as the door width are usually used.

Bricks are 1½-in thick. The grating, having a 1¼-in. depth, is grouted in place slightly higher in elevation than the surrounding brick floor.—*E. Anderson, General Manager, Zion National Kosher Sausage Factory, Inc., New York City.*



Fuel-Oil Heaters Cleaned Easier

Plenty of trouble is caused by excessive carbonization of coils and tubes in industrial fuel-oil-heaters. Let us consider three of the types:—film, multi-coil and tubular. Where rate and quantity of carbonization does not vary appreciably from one heater to the other, characteristics of the oil may be blamed.

Steam and solvent cleaning, individually giving fair results, requires much preparatory work in hooking up piping, attending to it during cleaning, and in final dismantling before putting heaters back on the line. Hence, the need for an "in place" cleaning method that combines the advantages of both steam and solvent application.

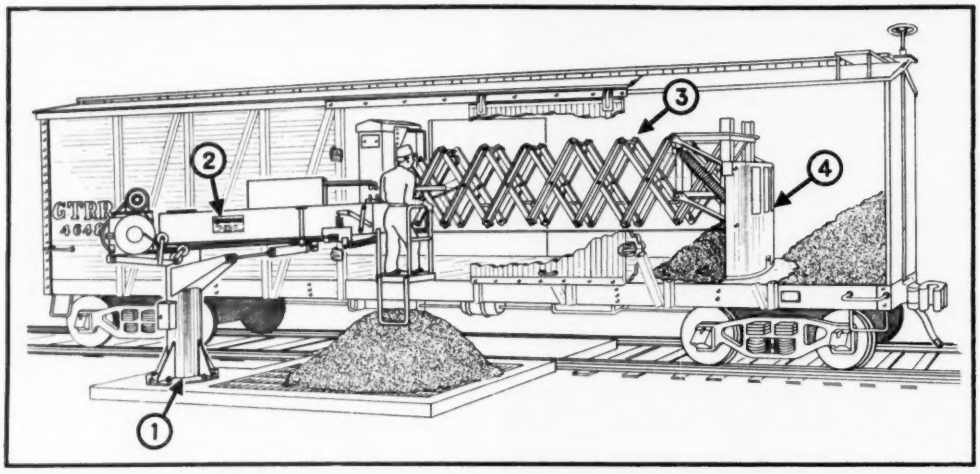
Original piping for all the heaters may be similar to that shown at (A) in the accompanying diagram. First, for the tubular heaters, the piping may be rearranged (B), adding an injector. To clean the heater, valves (a), (b), and (c) are closed, (d), (e), (f), (g) are opened.

High-velocity steam passing the solvent inlet draws in a steady stream, carrying it through the heater tubes to the basket strainer and sight glass on the discharge side. The strainer prevents solids reaching the sewer. The sight glass enables checking the cleaning progress. Discharge color progressively changes from black to brown, to almost white. When almost white, tubes are clean.

Piping hookups for multi-coil and film-type heaters are similar to those shown in (C) and (D). All pipe may come from the scrap pile, but valves should be new. And you may contract for strainers, sight glasses and injectors or build them in the plant shop.

Heater performance will be found entirely satisfactory. The fireman on watch can clean a heater in an hour, while performing his normal duties of watching pressure, water and burners.—*Tyler G. Hicks, Summit, N. Y.*

Food Equipment News



Box cars can be emptied in ½-hr. or less with use of this semi-automatic unit

Unloader-Sweeper Speeds Materials Handling

With the ingenious machine depicted here, a single operator can unload and sweep clean a box car of bulk materials in 30 min. or less. Further, use of the machine eliminates exposure of the operator to dust.

All operations are handled by one man from a control platform outside the car door. The full or semi-automatic control gives him free time to move the grain door, prepare car-puller cable, and perform other duties. Only time he enters the car is to snap a brush attachment to the scoop.

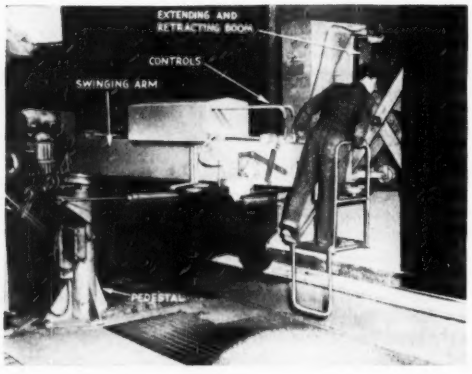
Unloader, shown in cut-away above, consists of: (1) the unit-supporting pedestal, mounted on a foundation clear of track and unloading hopper, (2) a swinging arm, on which is pivoted (3) a boom that can be extended into the box car, or retracted, and which carries (4) a scoop that is lowered to dig and move the material from the car.

Downward or digging action of scoop is positive and continues during the entire retracting stroke of the boom. Pressure can be adjusted by operator to suit nature and condition of material being unloaded.

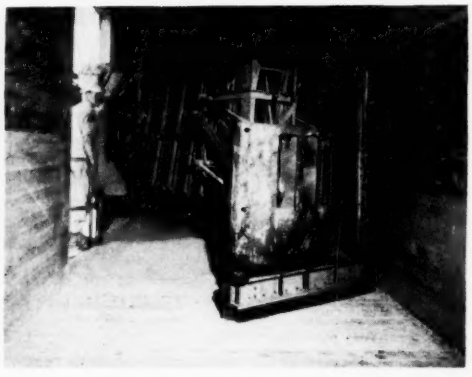
Unloading procedure is as follows: After the grain door is removed from a car and the material near the door flows out by gravity, the unloader motor is started, and the boom and scoop are swung into the car.

First, the boom and scoop are directed toward the opposite side, and the center of the car is unloaded. When set in motion, the scoop is in raised position and the boom extends until the scoop meets resistance in the form of material or the car wall. This resistance causes the scoop to dig into the material. The boom

Operator handles whole job from outside



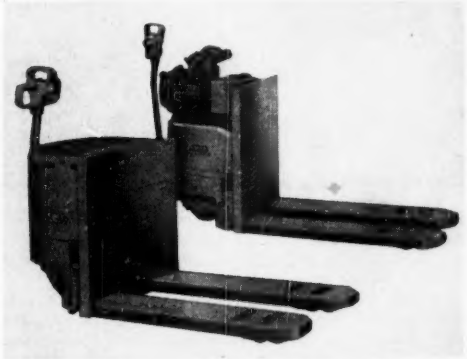
Sweeper does neat, fast clean-up



then automatically retracts and pulls the loaded scoop to the open door for discharge. When discharged, the scoop raises automatically and the boom extends to repeat the cycle.

When the center of the car is cleared, the boom is then directed toward one end of the car, and it continues in automatic operation until practically all of the material is discharged at that end. Operator then repeats at the other end of the car.

When practically all of the material has been discharged, the operator enters the car, for the first time, and clips the brush attachment to the bottom of the scoop. A rubber impact roller on each end of the attachment allows the brush to follow the car wall on each side without fouling, simplifying the job.—*Stephens-Adamson Mfg. Co., Aurora, Ill.*



Hand Trucks In Two Power Types A

Compactness, high maneuverability, ample power, and accessibility for ease of maintenance are reported features of new hand trucks offered in two power types. Both trucks use the same sturdy frame and are rated up to 6,000 lb. load capacity.

One of the new trucks, the Electro-Lift (left in photo) is battery-powered with motor drive; the other, the Hydro-Lift (right) is gasoline engine-powered with hydraulic pump and motor drive.

Electro-Lift is driven by a new GE compound motor which develops 1¼ hp. Automatic acceleration prevents overloading of driving motor and spilling of loads, and provides a smooth, swift get-away. Motor is mounted inside the 14-in. drive wheel; and the output shaft drives through a triple reduction of 32 to 1 into an internal gear attached to the wheel.

Entire drive unit is completely enclosed, assuring full protection from dirt. Motor maintains uniform speed on levels, whether the truck is loaded or empty; and has ample power reserve for ramp work. Brake is self-energizing, of external contracting type, applied to 9½-in. dia. by 3-in. surface on the wheel.

Control panel provides two points of power in each direction. And a walking beam in the control head makes it impossible to direct current to the motor in both directions at once. In the compact hydraulic lift system, the pump motor, pump, reservoir, relief valve and control valve are designed in one unit with a single line running to the lift cylinders.

In the Hydro-Lift the hydraulic motor is mounted in the same manner as the electric motor—in the 14-in. drive wheel, with the output shaft driving through a reduction to an internal gear in the wheel.

Gas engine drives a hydraulic pump of eccentric vane type with infinitely variable displacement from zero to 15 gpm. Displacement responds automatically to pressure requirements, the delivered volume of oil increasing as pressure decreases.

Pump in turn drives a constant displacement hydraulic motor of vane type with a sequence valve. Hydraulic pressure keeps the vanes in contact with the case at low speeds. Automatic torque multiplication provides ample reserve power for ramp work. The eccentric pump makes it impossible to stall the engine. Also, a unique valve linkage to the throttle provides finger-tip reversing.

Engine is 2-cylinder opposed type, air cooled, and rated at 5.5 bhp. at the governed speed of 2,800 rpm. A mechanical governor and fuel pump are standard equipment. —*Clark Equipment Co, Industrial Truck Div., Battle Creek, Mich.*

DON'T MISS THESE . . .

Exact liquid delivery of predetermined quantities are repeated by pushbutton control system..Page 96

"Stems Cherries Fast," item covering new compact machine having high efficiency.....Page 96

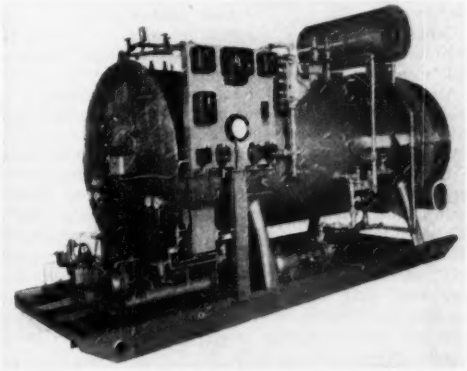
Feeder distributes any loose, flakey or granular materials uniformly upon wide conveyor.....Page 98

Alumium conveyor, specially adapted for use in prepackaged meat department, can be readily cleaned .....Page 100

AND WATCH FOR . . .

New angle disintegrator with improved sanitary features for fast, thorough cleaning....In December FI

Recently developed self-centering rolls that eliminate need for conveyor sideguards..In December FI



Operating Controls Improved on Boiler B

Greater fuel burning efficiency and easier operating control are reported in a new line of high and low pressure steam boilers.

Models range from 15 to 150 hp. and are fired by gas, oil, or a combination of the two.

To facilitate the adjustment of fuel-air ratio on all modulated units, a new linkage assembly is provided to

permit independent adjustment of either blower air or fuel.

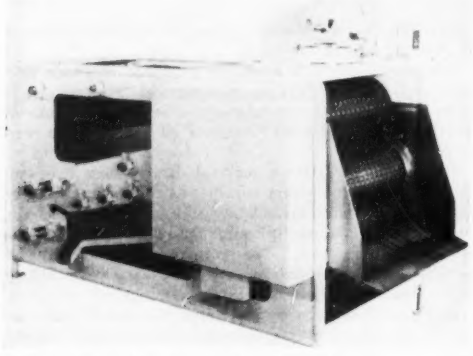
Design features include minimum length of oil piping and closer placement of heating components, aimed to improve the ability of units to handle the heavier and cheaper residual oils.

A new method of lubrication for the atomizing air compressor has been incorporated. This eliminates manual adjustment of the rate of lubrication.

Electronic type combustion safety controls are standard throughout the line. High pressure boilers are equipped with a double blow-down on each end of the boiler.

A below-the-waterline connection provides indirect heating of domestic or process water on all high pressure boilers. Low pressure boilers are available with immersion domestic water coils.

Heating engineers are representing the line in principal cities, providing engineering sales and service on all company equipment.—*York-Shipley, Inc., 61 Jessop Place, York, Pa.*



Stems Cherries Fast, Rarely Misses A

High efficiency and capacity are claimed for a new compact cherry stemmer employing specially constructed perforated rubber belts and head pulleys.

Capacities have been reported in excess of 4 tons of fresh and 2½ tons of brined cherries per hr. per machine, with a striking 98 percent stemming efficiency.

Also, space is reported economized, maker stating unit needs only about ¼ area used by present equipment. Unit is 7 ft. long, 4 ft. wide, and 5 ft. high.

Cherries are fed into a receiving hopper, mechanically or manually, then come to rest in circular perforations in the lower, ⅜-in. thick, belt. They are kept from falling through these holes by strips of rubber, about ⅛ in. wide, vulcanized to the lower side of this bottom belt diametrically across each hole.

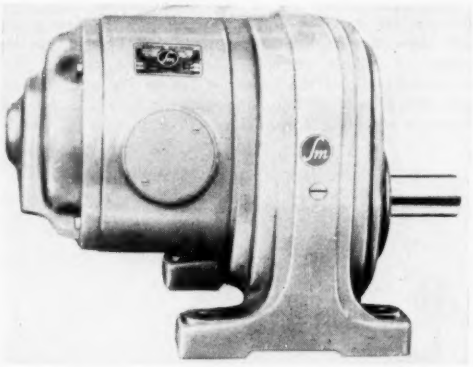
If surges in feed occur, an impeller gently pushes the fruit back until holes become available. Following the impeller, two brushes properly position the fruit in the holes and prevent cherries from proceeding on and being crushed between the two belts.

Cherry stems are now projecting either downward or upward out of the holes. About 98 percent are positioned with stems up.

As the belts contact the surfaces of the pulleys, the stems become locked between either the lower or the upper belt and the respective head pulley. And, as the pulleys revolve, the fruit is moved to the exit side of the machine. While the stem is locked between the head pulley and the belt, rubber rolls gently brush the cherries free of their stems.

Fruit falls onto an inspection grader. Stems revolve with head pulleys until belts disengage from them, when stems are brushed into a screw conveyor and discharged.

Since the thickness of the two belts is a total of ¾-in., and the perforations are greater in diameter than the largest cherry, injury to the fruit by the belts is eliminated.—*Atlas Pacific Engineering Co., Emeryville, Calif.*

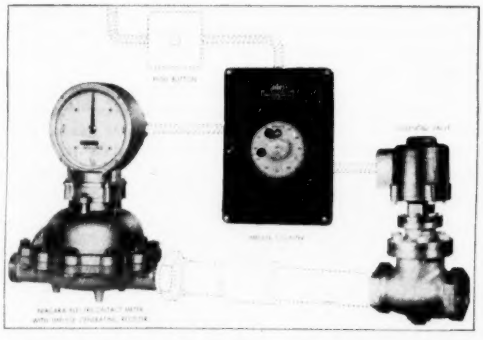


Geared Motor Is Splash-Proof B

This Slo-Speed geared electric power drive is now available in "splash-proof" design for horizontal floor mounting. It is suitable for locations subject to direct streams of water or other liquids.

End bell design (one piece cast with integrally cast baffles) permits free passage of ventilating air through the motor and prevents splashing liquids reaching the interior. Seals are incorporated on shaft ends, assuring positive protection against entry of liquids into the bearing housings.

These motors are built with single or double reduction gears, providing speeds from 780 down to 20 rpm. in ratings ½ to 15 hp. inclusive.—*Sterling Motors Inc., Los Angeles.*



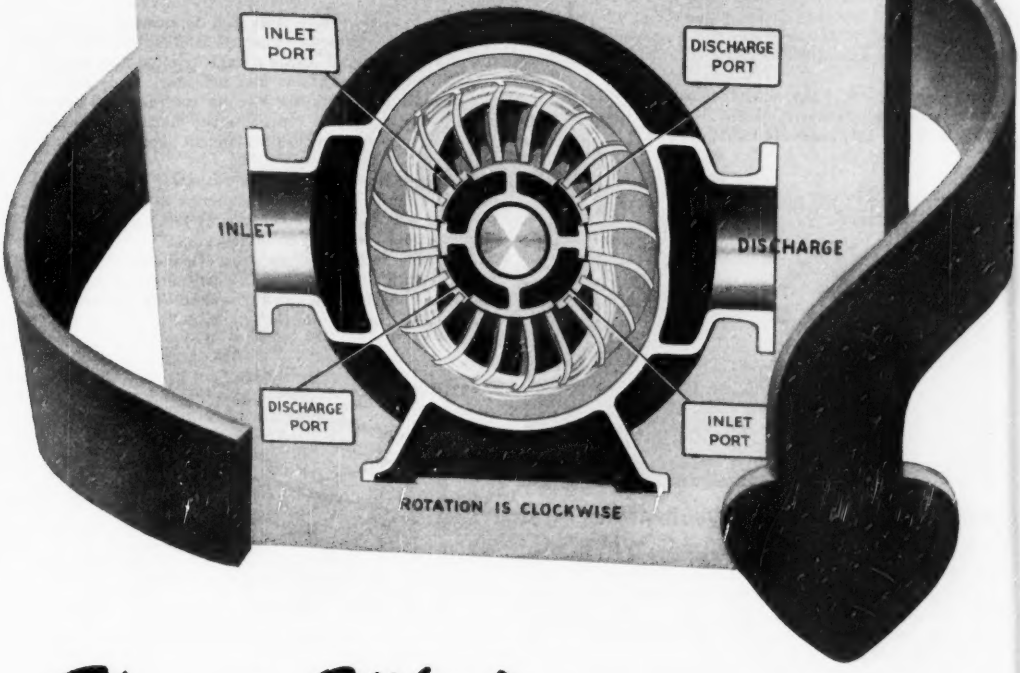
Exact Liquid Delivery by Pushbutton C

Accurate automatic liquid measurement is reported with the use of a new instrument system.

Called the Electrivolume control, it permits complete pushbutton regulation of repetitive deliveries of predetermined quantities of liquids. Company reports it does it more simply and economically.

Measuring is performed by an Electricontact meter,

Nash Instrument Air Compressors deliver only clean air, free from oil or dust, and without filters



Here is Why!

You can dispense with oil filters and dust filters when you install ®Nash® Clean Air Compressors. You can save the cost of maintaining these devices. You can greatly reduce instrument maintenance costs. For the Nash employs no internal lubrication, therefore no troublesome oil is in the delivered air. Moreover, air from a Nash is thoroughly washed and cooled as it passes thru the pump. Dust in the plant atmosphere, even fly ash, is immediately removed.

®Nash® Clean Air Compressors are simple, with only one moving element. No valves, gears, pistons, sliding vanes, or other enemies of long life and constant performance complicate a Nash. No aftercoolers are needed. You will find it profitable to investigate these pumps, now.

No oil filters.
No dust filters.
No internal lubrication to contaminate air handled.
No internal wearing parts.
No valves, pistons, or vanes.
Non-pulsating pressure.
Original performance constant over a long pump life.
Low maintenance cost.

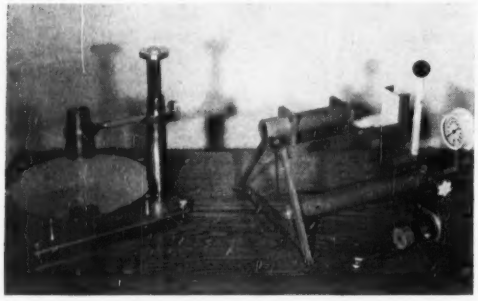
NASH ENGINEERING COMPANY
376 WILSON, SO. NORWALK, CONN.

built for whatever liquid is being used. It is stated that cold or hot water, viscuous or non-viscous oils, and many corrosive chemicals can be handled in this way.

Upon delivery of each unit of liquid, (which may be 1 gal., 1 lb., or 1 qt.), the meter generates an electric impulse. This is transmitted to a counter, which accumulates the impulses up to the predetermined and preset number. When this number is reached, the counter actuates another electric circuit, which shuts a solenoid valve and simultaneously recycles itself back to zero ready for the next run. Counter recycles to zero in 1 sec.

Combination of Electricontact meter, impulse counter and solenoid valve opens up a new field for industrial meter control of repetitive deliveries, according to the maker, who points out that here there is no necessity of resetting the meter manually to a new preset position before each run.

An alternate use of the meter is to actuate an electrically driven integrator remotely located from the meter itself.—*Buffalo Meter Co., 2890 Main St., Buffalo 14, N. Y.*



For Fast Check on Corn Quality A

These two instruments are the latest offered for measurement and maintenance of canned corn quality.

The consistometer (left) gives a quick measure of the consistency of cream style corn at the cut-out stage. It has also been found useful for such products as applesauce, jellies, and thick soups.

The succulometer (right) is a simple instrument for measuring maturity of whole grain corn. It is stated to be the only available instrument which will gage maturity of either raw or canned kernels. Results are obtained by this unit in a few minutes, and they are reported to correlate closely with those of the alcohol insoluble solids test.

Light in weight and requiring little experience for operation, the succulometer is termed an excellent tool to aid the field man in determining the proper time to harvest a crop.—*Food Machinery & Chemical Corp., Hoopeston, Ill.*

Automatically Records Scale Weights B

For use with tape-drive dial scales, a new device for the recording of scale weights has been developed.

Called the "Teleprint," it combines electronic, electrical and mechanical engineering to "take the dial reading" and convert it to weight-printings set up on type wheels for impression either on a wide variey of tickets and forms or on single or double roll tapes.

Three components make up the assembly—a take-off unit, mounted as a part of the dial housing; a Servo-amplifier; and a recorder unit, remotely connected to the take-off by cable.

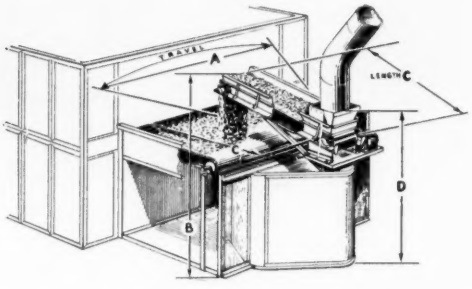
Want More Information?

It's free—and easy to get. Say for example, you want added details on the item marked "B" here on page 98. Just turn to one of the special Reader Service postcards inside the front cover and circle the 98B. Sign at the bottom and mail—no stamp needed. Then the extra information will be on its way to you.

Translation of weight from dial to printing is accomplished with accuracy. Take-off unit is an electronic follow-up system that tracks a single pointer-type electrode mounted on same shaft as dial indicator. This activates and maintains synchronism with the recorder unit through a Servo mechanism, to reproduce the dial reading exactly and set up the recorder to print weight automatically when scale comes to balance.

Notable is the remote-action feature. With the take-off and recorder mechanisms designed as separate units, the latter may be located 500 or more feet away from scale site, with only addition of extra cable.

Also, this recorder offers great flexibility. It can be mounted on a desk, placed on a portable stand, built in to a control panel, or adapted elsewhere—to fit the user's needs.—*The Howe Scale Co., Rutland Vt.*



Feeder Distributes Materials Evenly C

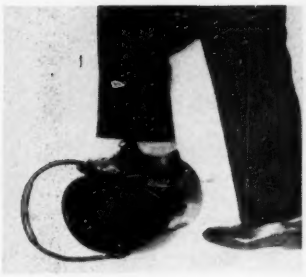
Any loose, flakey or granular material is distributed uniformly upon a wide conveyor by a recently developed feeder —a hydraulically powered oscillating unit.

The hydraulic power gives simple and accurate control, both of the speed and of the travel of oscillation. Thus it is possible to load an even bed of material on the main conveyor, insuring a uniform density of load, side to side.

A hopper, which is part of the equipment, receives material from the feed chute and deposits it on the oscillating feeding conveyor. Speed of the feed conveyor, also its length, can be adjusted to change the loading characteristics as required.

Feed conveyor is mounted on top of column which provides a fulerum point and a mount for the oscillating controls. These controls are quickly adjustable to limit the travel to obtain the desired path over the main conveyor. Mounted within the cover of the supporting stand is the self-contained pump unit, hydraulic cylinders, and other controls for the equipment.

Referring to sketch, dimensions labeled (A), (B), (C) and (D) may be varied to suit customer's requirements.—*Proctor & Schwartz, Inc., 7th St. & Tabor Rd., Philadelphia, 20.*



New Chemical Pail Is Unbreakable A

For greater safety and convenience in the handling of corrosive solutions there is offered a new 3-gal. chemical pail with the trade name "Ace-Hide."

According to maker, material is a new, tough, resilient, high-styrene copolymer rubber that provides an excellent combination of light weight, corrosion resistance, and strength.

Pail will not chip or crack, and it is easy to clean because chemicals cannot penetrate the impervious coating. Pouring spout is designed to eliminate costly, dangerous drip, and it keeps corrosive chemicals from running down sides of pail. It will pour an easily directed stream into narrow-necked vessels.—*American Hard Rubber Co., 11 Mercer St., New York City 13.*

Polyethylene Coatings Sprayed on Equipment B

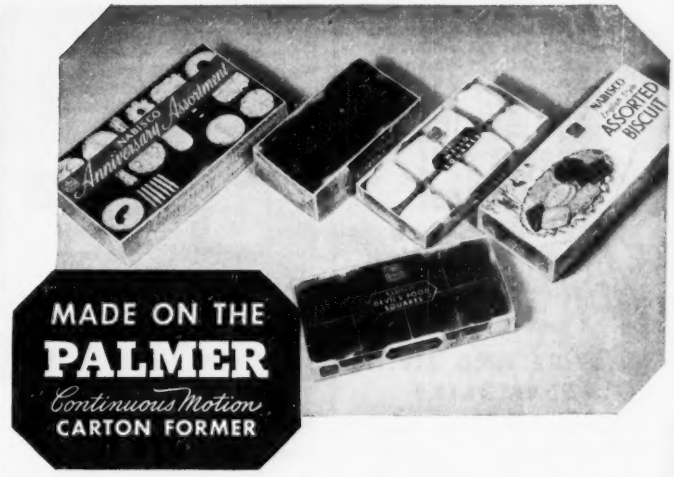
Reported is a new method of coating polyethylene on steel tanks, tank cars, and processing equipment.

Improved corrosion resistance is claimed for the method, a flame spray process which uses no solvents. Coatings are applied in thicknesses from 1/32 to ¼ in.

After the tank to be coated has been sand blasted, polyethylene in powder form is blown through specially designed flame spray equipment. Deposited on the tank in melted form, the plastic material sets up a tough, non-porous film which has unusual resistance to practically all chemicals and corrosive materials.

This method of applying protective coatings is stated to eliminate danger of pin holes and other defects which might permit corrosion to start. Resulting coating is termed odorless, taste-free, and non-toxic.

Considerable laboratory and pilot plant data are available on the process, which has been in development for two years. Company will coat existing equipment, supply new coated tanks, or furnish equipment and personnel for coating field applications.—*Houghton Laboratories, Olean, N. Y.*



MADE ON THE
PALMER
Continuous Motion
CARTON FORMER

You, too, can make your own cartons
AT DRASTIC SAVINGS

These handsome NABISCO packages are truly representative of the fine quality baked goods they contain... Sturdy, well-formed and beautifully printed... National Biscuit Company, noted for operating the most modern plants, makes such cartons on our Palmer Continuous Motion Carton Former.

Using inexpensive die-cut blanks, this machine forms and glues cartons at speeds of up to 102 per minute. Blanks cost far less than finished cartons, they can be stored in a minimum of space, and the machine is so easy to operate that one attendant often takes care of three machines.

You can use a Palmer for various sizes of packages, for it is easily adjustable. And there is practically no limit to the different types of cartons which it can produce.

LOOK INTO THIS

Our Engineering and Designing Department will be glad to show you the type or types of carton that would meet your needs, and will give you an estimate of the savings a Palmer machine would make.

Literature on request.

PACKAGE MACHINERY COMPANY • CARTON DIVISION
Springfield, Massachusetts

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DALLAS DENVER LOS ANGELES SAN FRANCISCO
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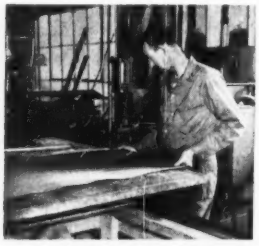
At your Service

ON WIRE AND METAL ASSEMBLIES

Cambridge offers the most modern fabricating facilities plus years of engineering experience . . .

. . . to make any wire and sheet metal tray, rack, basket, fixture, crate, screen or other fabrication you need to reduce costs and speed-up material handling processing and treating. The fact that Cambridge is equipped to perform every step of the designing and manufacturing assures you of the famous Cambridge quality and service on all items.



Your Cambridge field engineer can recommend the right design and construction for washing, spraying, dipping and similar operations.

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Wire cloth in rolls. | Any metal or alloy, mesh or weave.

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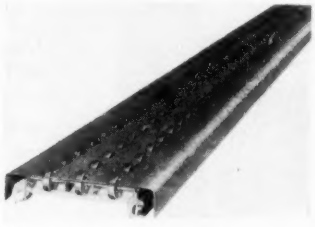
See "Baskets, Wire" In Your Classified Telephone Directory

New Delivery Truck For City Service A

To combat city delivery problems of traffic congestion, high costs, weight and length restrictions, a new model "3014" power-lift cab truck has been introduced. New model was put through severe tests in which the following features showed to advantage.

Combination of much shorter wheelbase (129 in.) and wider tread front axle adds to manueverability in city service. And former also permits saving of 2 ft. in overall length. Lower frame height cuts down on driver's reaching and lifting. And low cab floor height, wide doors, no obstructions in cab and one curb-level step add up to time-saving on delivery stops.

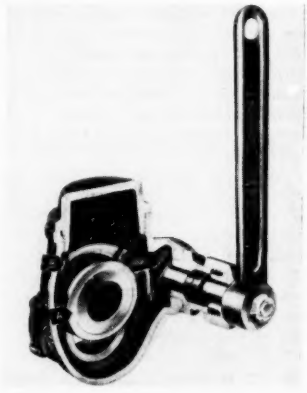
Driver's seat out front, with all-angle visibility, makes for extra safety. Power-lift cab is stated to reduce maintenance time one-fifth. And finally, appearance of truck has been given much attention for sales value.—*The White Motor Co., Cleveland 1.*



Aluminum Conveyor Easily Kept Clean B

Especially adapted for use in prepackaged meat departments is a new type conveyor with frame and axle assembly shielded by a smooth, readily-cleaned aluminum cover. Unit is designed to handle containers of food in operations calling for high sanitary standards.

Conveyor features lightweight, sturdy construction, with aluminum channel frames and wide extruded aluminum cross-members. Three lanes of lifetime grease-packed aluminum wheels, spaced on 3-in. centers, promote smooth handling of both large and small containers. A 14-gage aluminum shield, slotted to allow conveyor wheels to project, is fastened to top flange of frame with countersunk bolts. Shield covers frame and axle assembly, forming smooth exterior surfaces easily kept sanitary.—*The Rapids-Standard Co., Inc., 342 Rapistan Bldg., Grand Rapids 2, Mich.*



New Lever-Gate Valve Is Self Polishing C

Maximum tightness and long life are reported for this new rapid-action, bronze lever-gate valve.

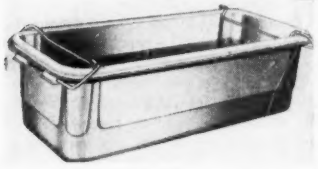
The valve, known as the "Swingtite," has ball-and-socket design double disks which adjust readily to seat surfaces. Referring to photo, guide rims (A) on these disks rotate freely, as the

valve opens or closes, on the guide tracks (B) cast in the body.

This roller action provides a self-cleaning and polishing effect, and also distributes the wear, since the seating position of the disks changes with each closing. Rolling disk and track construction is intended to assure accurate seating with continual tight closure and to prevent rapid, uneven wear of the disks.

With liberally dimensioned body and cap, tough manganese bronze spindle, and deep packing box, valve is stated to withstand rough usage while containing high pressures. To suit installations, malleable iron lever can be placed in four different positions with relation to spindle. For remote operation, rope, chain or rod can be attached through hole in outer end of lever.

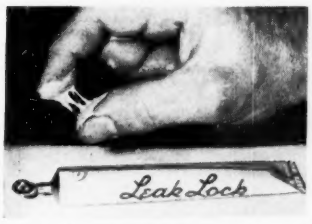
Rating is 125 lb. steam service, and 300 lb. cold oil, water or gas. Valve is made in ½ in. to 2 in. sizes.—*Jenkins Bros., 100 Park Ave., New York City 17.*



Seamless Aluminum Box Is Highly Sanitary A

This aluminum-alloy handling box, for meats, fish, poultry and perishables, is extra sanitary because of a seamless drawing operation. All corners are rounded, with no cracks, crevices or rivets, making cleaning simple and sure.

Weighing only 11 lb. and measuring 32 x 13½ x 10 in. deep, boxes can be stacked on delivery, nested on return.



For Refrigerator Leaks B

New sealing compound, named Leak Lock, incorporates a special poly-hydroxylated plastic base stated to withstand "Freons" and other refrigerants. It sets up very fast and remains plastic enough to permit easy disassembly.—*Highside Chemical Co., 10 Collax Ave., Clifton, N. J.*

THE SHELF-SHAPE BAG THAT PACKS WITHOUT SLACK

Deltaseal®

One reason why more manufacturers are turning to the DELTASEAL PACKAGING SYSTEM*

Deltaseal Bags are flat . . . top and bottom . . . so, they're easy to stack in attractive, space-saving displays. There's no slack-pack appearance to discourage sales. The Deltaseal closure helps the bags keep that full-pack look. Housewives like this closure, too, because the "built in" spout makes easy pouring.

Deltaseal lowers packing costs. Deltaseal Packaging Machinery is designed for Deltaseal bags alone. It fills, shapes and closes the bags fast . . . 2,000 or more an hour, depending on the commodity. Mostly automatic, it handles volume packing with real efficiency.

Let a Bemis representative explain more of the benefits in the Deltaseal Packaging System. Call or write your nearest Bemis office.

***THE DELTASEAL PACKAGING SYSTEM** Deltaseal Bags plus the Deltaseal Packaging Machinery.

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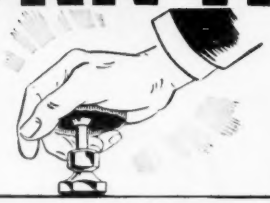
Bemis

JUST TURN IT

AND GET

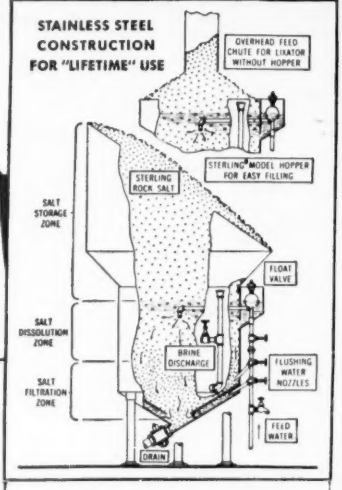
BRINE



That's Just Right Without Measuring Or Stirring!

STERLING ROCK SALT BRINE DELIVERED BY PIPE TO EVERY POINT IN YOUR PLANT

• FLAVORING • WASHING • SOAKING
• BLANCHING • GRADING • BRINE PEELING
• ZEOLITE WATER SOFTENERS • PICKLING



• Why trust to "rule-of-thumb" measuring? Why go through the laborious shoveling, hauling, and hand stirring of salt and water? With International's Lixate Process for Making Brine you are assured accurate salt measurement every time. Stops waste through spilling. Saves time and labor.

• The Lixator *automatically* produces 100% saturated, free-flowing, crystal-clear brine which may be piped to as many points in your plant as you wish — any distance away — by gravity or pump. YOU SIMPLY TURN A VALVE to get self-filtered LIXATE Brine that meets the most exacting chemical and bacterial standards.

Savings up to 20% and often more in the cost and handling of salt have been reported by many Lixate users. Why not investigate?

HOW LIXATOR WORKS

In the dissolution zone—flowing through a bed of Sterling Rock Salt which is continuously replenished by gravity feed, water dissolves salt to form 100% saturated brine. **In the filtration zone**—through use of the **self-filtration** principle **originated by International,** the saturated brine is thoroughly filtered through a bed of undissolved rock salt. The rock salt itself filters the brine. Nothing else is needed.

WHAT THE LIXATOR PROVIDES

- ✓ **Chemical and bacterial purity to meet the most exacting standards for brine.**
- ✓ **Unvarying salt content of 2.65 pounds per gallon of brine.**
- ✓ **Crystal-clear brine.**
- ✓ **Continuous supply of brine.**
- ✓ **Automatic salt and water feed to Lixator.**
- ✓ **Inexpensive, rapid distribution of brine to points of use by pump and piping.**

An INTERNATIONAL Exclusive

The **LIXATE*** *Process*

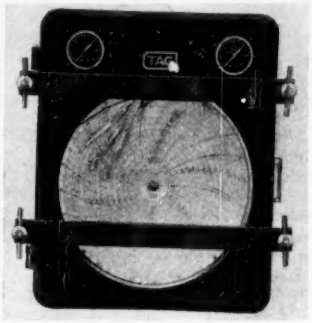
FOR MAKING BRINE

*REG. U. S. PAT. OFF.

INTERNATIONAL SALT COMPANY, INC., Scranton, Pa.

Side panels are embossed for strength, bottom debossed for cleaning purposes.

The stainless steel handles have solid weldments for hinges and for wearing strips on top rim.—*Republic Stamping & Enameling Co., Canton, Ohio.*

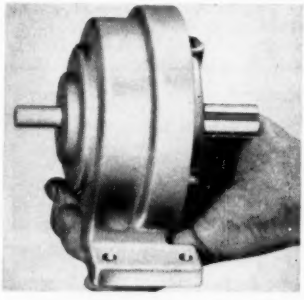


Automatic Instrument Controls Humidity A

Recently announced is an instrument which records and automatically controls humidity.

Utilizing the psychometric wet and dry bulb principle, the controller keeps the wet-bulb regulated, regardless of any fluctuations in the dry-bulb temperature.

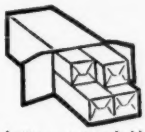
Two pens operate on a circular 10-in. chart, simultaneously recording the dry-bulb temperature and the wet-bulb depression. The flow of the humidifying agent (moisture or steam) is regulated by a valve which is operated by the control instrument.—*Weston Electrical Instrument Corp., 614 Frelinghuysen Ave., Newark 5.*



Fractional Hp. Speed Reducer B

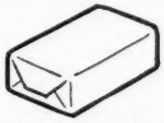
New heliocentric speed reducer for all in-line applications in the ¼-to-1 hp. range has been announced. Maximum torque capacity is 1,000 in.-lb., while input speed should not exceed 1,800 rpm. Anti-friction ball bearings are used throughout.—*Universal Gear Corp., Indianapolis, Ind.*

Why so many foods BELONG in Patapar



Patapar butter wrappers hold in moisture. Help keep butter fresh. Popular sizes. Beautifully printed.

With its wet-strength and grease resisting qualities, Patapar gives bacon real protection.



Patapar is excellent as a package liner or wrapper for cheese packed in cartons.

Fresh, frozen or dried fish keeps well and looks well wrapped in Patapar.

Patapar is wonderful, too, for:

Margarine wrappers
Ham boiler liners
Deep freeze wraps
Milk and cream can gaskets
and many other uses

PROTECTION:

With its high wet-strength, grease-resistance and other unique qualities, Patapar Vegetable Parchment does wonders in keeping foods fresh – appetizing.

SALES APPEAL:

Patapar has rich, beautiful texture. Printed with colorful inks it makes a package that you can really get excited about. Our plants are specially equipped for printing Patapar in one or more colors by letterpress or offset lithography.

Patapar printing service includes sketches, art work, engravings, typesetting – everything.

Now is a good time to investigate Patapar with future needs in mind.

Patapar Keymark, nationally advertised symbol of wrapper protection

Paterson Parchment Paper Company • Bristol, Pennsylvania

Headquarters for Vegetable Parchment since 1885

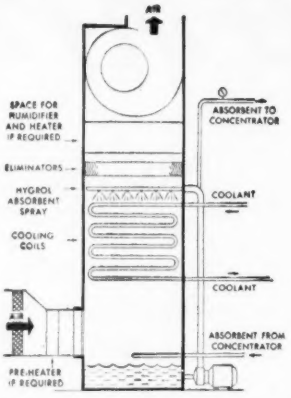
WEST COAST PLANT: 340 BRYANT STREET, SAN FRANCISCO 7 • SALES OFFICES: NEW YORK, CHICAGO

How You Save with the NEW Niagara Method of Air Conditioning

Using "Hygrol" Hygienic Absorbent Liquid

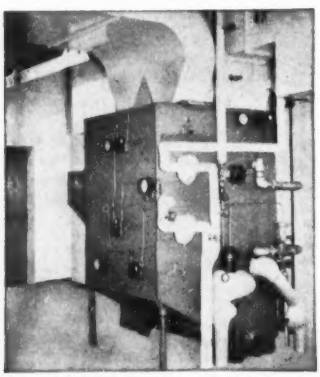
Because it absorbs moisture from the air directly, the new Niagara Controlled Humidity Method uses less, or no, mechanical refrigeration for dehumidifying. You save first costs and installing of heavy machinery. You save space, maintenance expense, power. You get easier, more convenient operation.

Using "Hygrol" hygienic absorbent liquid, this method gives complete control of temperature and relative humidity. Especially, it is a better way to obtain dry air for drying processes, packaging hygroscopic materials, preventing moisture damage to metals, and obtaining better quality for chemical process products and food products—or in obtaining better results in comfort air conditioning for office or laboratory at lower refrigeration costs.



NIAGARA CONTROLLED HUMIDITY METHOD — FLOW DIAGRAM

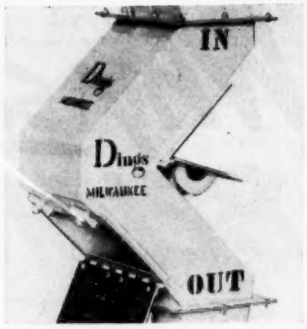
Food Packaging under Controlled Humidity


Niagara Controlled Humidity Air Conditioner

The diagram shows how filtered air is dehumidified by passing thru a spray of "Hygrol"—a liquid absorbent which removes air-borne moisture. This liquid is hygienic and non-corrosive; it contains no salts or solids to precipitate and cause maintenance troubles. It is continuously re-concentrated at the same rate at which it absorbs moisture, providing always the full capacity of the air conditioner, automatically.

Units provide a range of capacities from 1000 to 20,000 C. F. M. Multiple unit installations are in use successfully. Records of results are available. For further information, write Niagara Blower Co., Dept. FI, 405 Lexington Ave., New York 17, N. Y.

ADVERTISEMENT



Anti-Iron Hump A

Two separate permanent non-electric magnets are incorporated in this hump unit for removal of tramp iron from materials carried by air through ducts or flowing by gravity through chutes. Material flow impinges directly against either or both magnets, providing maximum attraction for removal of the foreign matter.—*Dings Magnetic Separator Co., 4740 W. Electric Ave., Milwaukee 46.*

Equipment Briefs

Opens Cartons Neatly B

Featuring a blade holder that can be quickly adjusted to cut varying thicknesses of covers is an improved carton opener. Contents of container are protected because blade penetrates just under outer cover thickness. Opener is made of zinc.—*Flash Box Opener Co., Inc., 52 W. Houston St., New York 12.*

Seamless Face Work Gloves C

Greater flexibility and longer wear are reported for a new all-purpose work glove, with elimination of the seams from the primary work areas. Removing the seams from the front insures more usability at the point of greatest stress—where thumb meets palm. New glove is made of chrome-tanned pearl gray cowhide with striped herringbone flannel back, and has a water-resistant cuff which may be safely dry cleaned.—*Richmond Glove Corp., Richmond, Ind.*

Marks Glass Permanently D

Useful for a variety of laboratory tasks is a special pencil for permanently marking glassware. Used is a tungsten carbide point. It's mounted in a knurled steel shaft and protected by a cap for safely carrying in pocket.—*Fischer Scientific Co., 717 Forbes St., Pittsburgh, Pa.*

Aluminum Nomenclature Approved E

Standard nomenclature has now been adopted to clarify the designation of aluminum sheet and plate: (1) Plate is a solid section rolled to a thickness of 0.250 in. and heavier in rectangular form with either sheared or sawed edges. (2) Sheet is a solid section rolled to a thickness range of 0.006 in. to 0.249 in. inclusive, supplied with sheared, slit, or sawed edges. (a) Flat sheet is furnished in rectangular form with sheared, slit, or sawed edges, which may be flattened by any standard method. (b) Coiled sheet is furnished in rolls (coils) with slit edges.—*The Aluminum Association, 450 Lexington Ave., New York City 17.*

—*End*

TO GET THE RIGHT Lightnin® Mixers

MIXCO® Engineered

JUST USE THIS HANDY CHECK LIST

Every LIGHTNIN Mixer you buy is guaranteed to do the job for which it is recommended—or you get your money back.

To get a portable mixer that will do the job and stand up, here's all the data you need to send us:

- √ **Dimensions and shape of the tank.**
- √ **Ingredients being mixed.**
- √ **What you expect the mixer to accomplish, and in what length of time.**
- √ **Electric current voltage, cycle and phase (or air pressure, if you plan to use a LIGHTNIN Air Drive Mixer).**

Our application engineers will promptly recommend the right portable mixer for the job you have in mind. In every case MIXCO assumes full responsibility for the success of the installation.

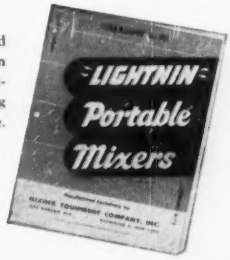
For more complex jobs, or where permanently mounted mixers are required, send for our helpful Mixing Operations Data Sheet. Just check the coupon below.

Lightnin® PORTABLE MIXERS

Electric motor driven, gear drive (shown) or direct drive—⅛ to 3 H.P. Also available with air motor, geared or direct drive types, from ⅛ to 1 H.P. Motors available for all characteristics. Smooth mixer lines permit easy sanitation. Ball and socket clamp provides famous LIGHTNIN double mixing action. Mixer can be rotated 360° horizontally and 90° vertically. Shafts and propellers are highest quality stainless steel. Standard propellers are accurately balanced for vibration-free operation. Easily adjustable on shaft or removable. For complete information, send for Catalog B-75.

PROCESS ADAPTED AGITATION
TOP-ENTERING
PORTABLES
LIGHTNIN MIXCO
SIDE-ENTERING

SEND FOR big 28-page illustrated catalog and 4-page supplement on portable mixers and their applications. Much of its data on mixing is available from no other source. Ask for Catalog B-75.



Complete Mixing Service for the Food Industries

FOR CLOSED TANKS—LIGHTNIN top entering propeller type agitators are available in electric motor driven construction from ¼ to 3 H.P., and in air motor driven type from ¼ to 1 H.P. Send for Catalog B-78.

FOR HEAVY DUTY MIXING— LIGHTNIN top entering agitators—turbine or paddle type. 16 interchangeable speeds in new heavy-duty drive. Sizes, 1 to 200 HP. Send for Catalog B-36.

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(MIXCO)

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Please send me the literature checked:

- ☐ B-75 Portable Mixers (Electric and Air Driven)
- ☐ B-78 Top Entering Mixers (Propeller Type)
- ☐ B-89 Top Entering Mixers (Turbine and Paddle Type)
- ☐ Mixing Operations Data Sheet

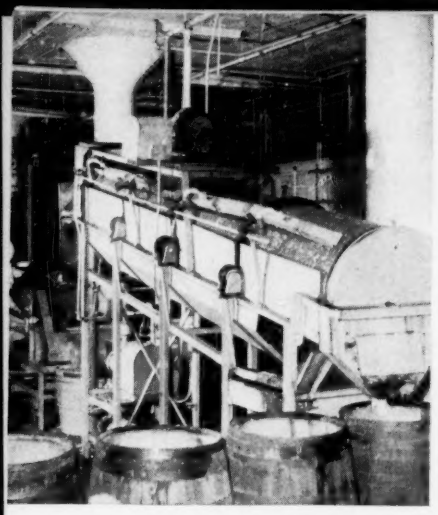
Name ..... Title .....

Company .....

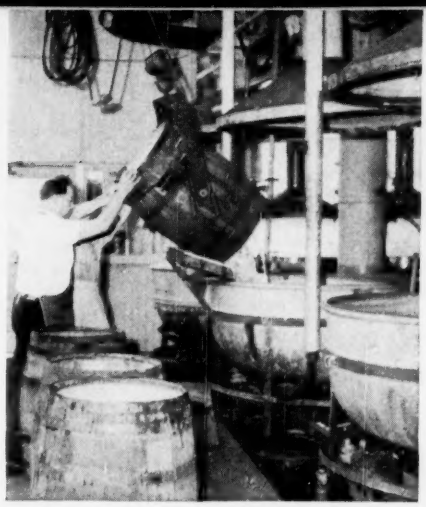
Address .....

City ..... Zone ..... State .....

TURN PAGE FOR FOLDOUT FLOWSHEET →



1 **REEL'S** high-pressure sprays wash loose "rag" from diced citrus peels.



2 **ELECTRIC HOIST** feeds brined peels into kettle for the tenderizing operation.

UNFOLD HERE

Making Glace Sweets and Allied Items

Layout of Lines That Have Ended Guesswork, Saved Time, Labor

IMPROVED METHODS mark the fruit-specialty operations of Lyons-Magnus, Inc., one of the largest makers of glace confections.

Notable among the outstanding improvements are the new liquid sugar and corn syrup handling, also the syrup-circulating methods.

Steps in producing the glace peel—and also the baker's jelly, toppings, fountain syrups, chocolate syrups, and maraschino cherries—are depicted in the accompanying foldout flowsheet. Photos illustrate key stations in the operations.

Primary in the fruit-specialty processes is making glace peel—Points (1-8) in diagram. Peels are initially diced into $\frac{3}{8}$-in. cubes, which then pass through a washing reel. Next, they go into kettles, where the peels are cooked to tenderize them and drive off the SO_2.

The glace step is next—Point (4). Here, truckloads of blanched peels travel through a special unit in which syrups of increasing density—from 20 to 80 deg. Brix—are circulated through the peels.

Leaving the circulator, peels are then washed in kettles to remove heavy syrup from their surfaces. Peels are then inspected, weighed into batches (according to formula), and blended in a mixer—Point (7)—along with other glace fruits. Finally, mixed peels and fruit are filled into cartons, and these are check weighed before they are overwrapped with cellophane.

Second fruit-specialty process depicted is the preparation of baker's jelly. Dilute syrups used in the glace process are recovered, filtered, concentrated to a specific density, and then pumped to fruit-syrup holding tanks. Next, the syrup goes to a 500-gal. kettle equipped with agitator. Pectin and acid are added, with color and flavor. After cooking, jelly is filled into 30-lb. tins or 500-lb. barrels (next to maraschino cherry dept.).

Third process is manufacture of the fountain syrups. Some base syrups are prepared in one of the tanks in the syrup gallery. Others are made up in the evaporator department—Point (9).—where color and flavor are added and the product is adjusted to the final Brix. Then the syrup is pumped to a holding tank, from which it is filled into cans or gallon jars.

Making toppings: Here, liquid and corn syrups are pumped into a mixer—also Point(9)—where fruit and other ingredients are added. After mixing, and then heating, the batch is drawn into a vacuum pan, where it is cooked to the desired density before it is filled into cans.

Producing chocolate syrup—Point (10)—calls for addition of cocoa and other ingredients to the syrup. Cooked to the desired density, the syrup is then homogenized and filled into cans.

Final fruit-specialty process depicted is the manufacture of maraschino cherries. Barrels of SO_2-packed cherries are first stemmed in a cluster breaker. Next, the stemmed cherries go over an inspection table, where damaged and poor quality fruit are removed. The cherries are then elevated to a grader to be separated into four sizes. From here they go to the special pitting machine, which is equipped with twelve pitting knives.

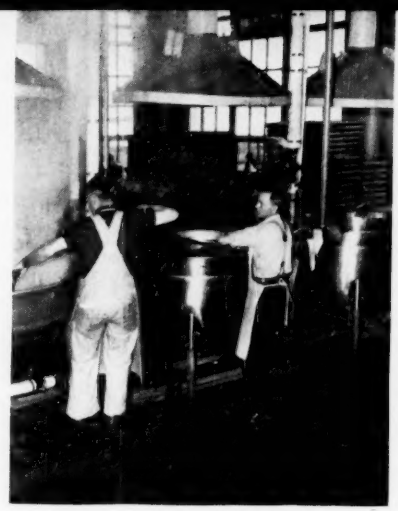
Cherries travel from the pitter onto a belt, to be "candled" while passing over a battery of fluorescent lights. The lights enable the inspectors to spot and remove cherries that still have pits. The pitted cherries are now boiled in kettles to tenderize them, then they are colored, and finally they get the finishing syrup treatment prior to packing.

Don't Miss the Full Art-to-Science Story

It's lucidly recounted in "Processing Glace Peels"—this month's Special FI Report revealing how Lyons-Magnus' modern technics have mechanized traditional skills—to do a top-efficiency job. You'll find it on page 77.

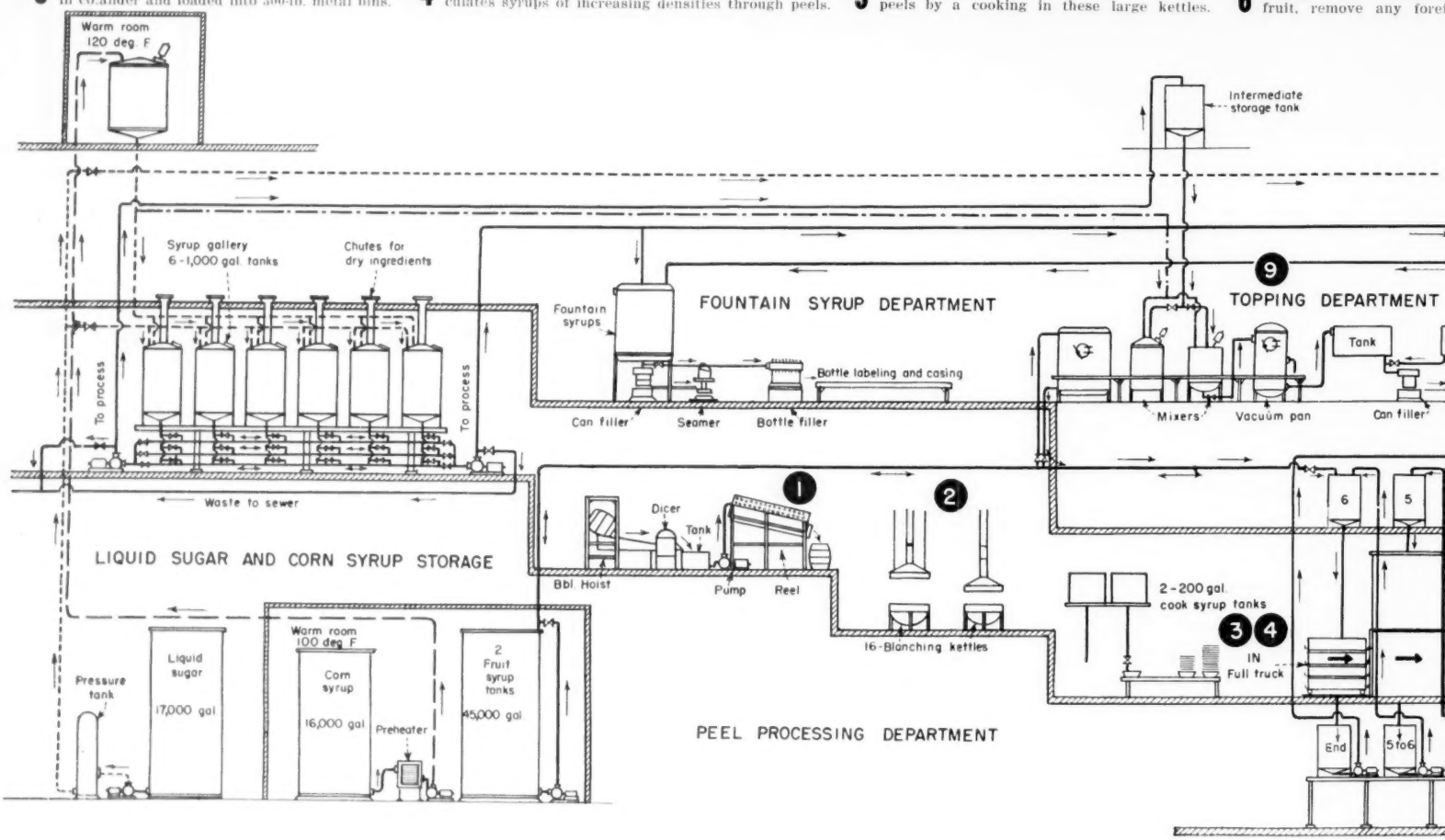
3 **BLANCHED PEELS** are bailed from kettles in colander and loaded into 300-lb. metal bins.

4 **TRUCKLOADS** of bins travel through unit that circulates syrups of increasing densities through peels.



5 **HEAVY SYRUP** is washed from surfaces of peels by a cooking in these large kettles.

6 **INSPECTORS** cull out th fruit, remove any forei

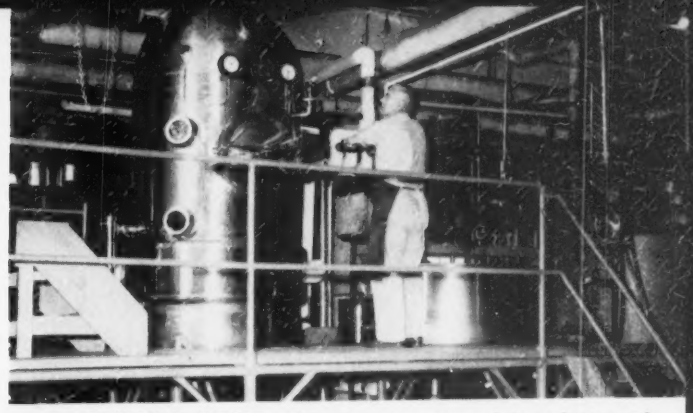


F I PICTURE - FLOWSHEET NO 23

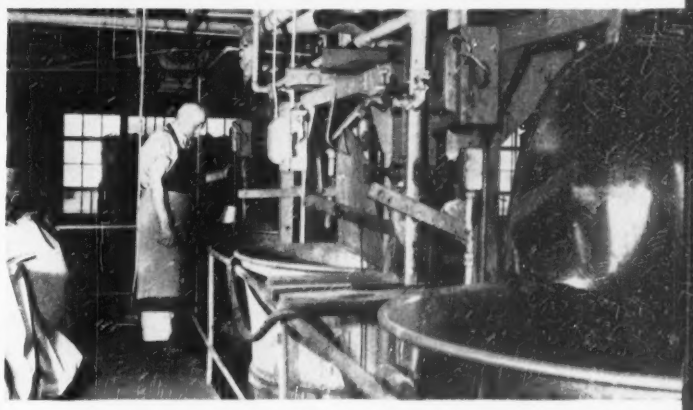
out the off-grade foreign matter.

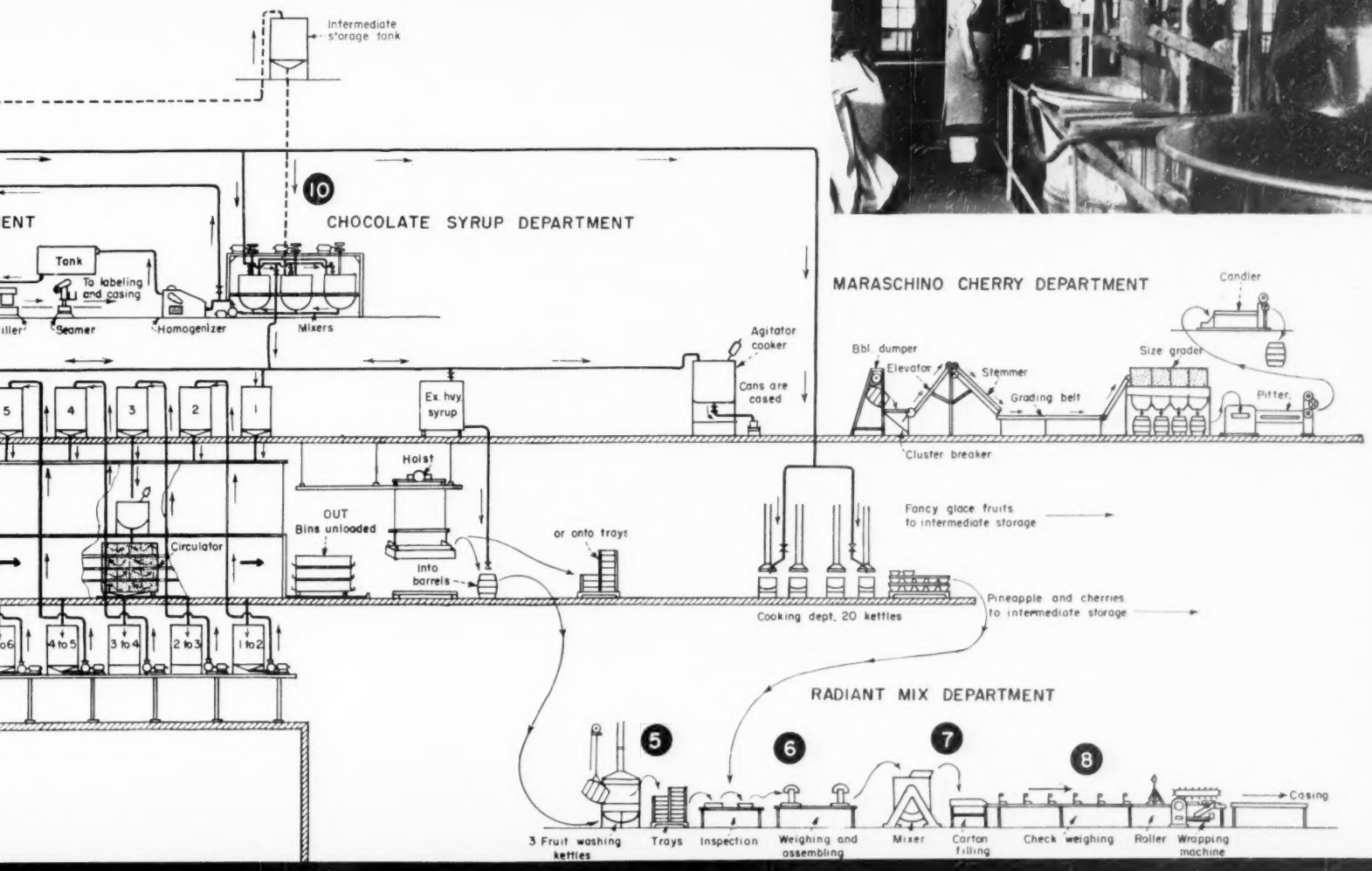
7 **MIXER** blends various peels and fruit to make Radiant Mix.

8 **MIXED FRUIT** is weighed in 1-lb. cartons. Overwrapping follows.



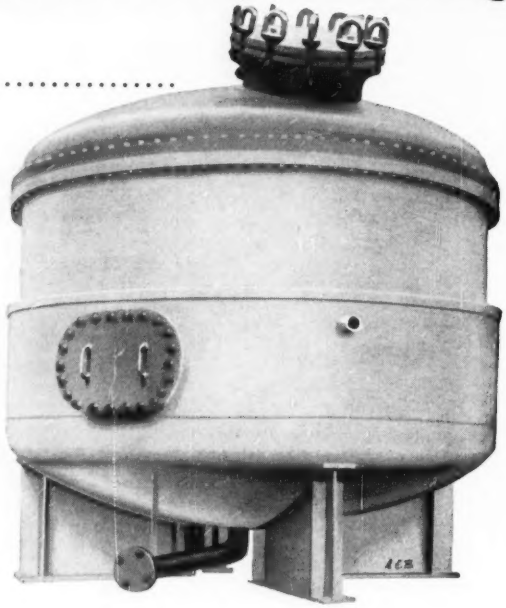
9&10 **FOUNTAIN SYRUPS** and toppings are processed in preheater and vacuum pan (above). Chocolate syrup is made in kettles (below).





ONE OF A SERIES DEMONSTRATING APPLIED LUKENOMICS

How to Make Gelatin Extraction as Easy as its Eating



PROJECT: *To obtain maximum yield of high-purity gelatin with maximum economy in batch extraction process involving a pH acid condition. Discoloration and off-flavor from hot spots must be prevented.*

DESIGN: *Jacketed steam-heated tanks with smooth flowing, curved contours and flued openings. Inner tank shell of Lukens Nickel-Clad Steel; outer tank shell of carbon steel. Circulation of steam provided for by passage between shells. Rapid heatup and shutdown and uniformity of heat dispersion assured by nickel-clad steel walls. Resistance to acid attack and ease of cleaning with strong cleansers provided by smooth, curved, unobstructed nickel interiors of inner tank; strength and rigidity by its steel backing.*

END RESULT: *Increased batch production of high-purity, flavor- and color-true gelatin with minimum operating and maintenance costs.*

Here is another example of how the coordinated ingenuity of designer, engineer, fabricator and materials supplier resulted in the efficient, economical answer to an equipment problem. This was the result of applied *Lukenomics*. For Lukenomics combines the experience of equipment designers and builders with Lukens' knowledge gained over 140 years as the world's leading producer of specialty steel plates, heads and steel plate shapes.

It's sound judgment to put Lukenomics to work on your equipment problems. There are progressive fabricators who can do this for you. Get in touch with them, or write our Manager of Marketing Service, stating your problem. Lukens Steel Company, 401 Lukens Building, Coatesville, Pennsylvania.

Artisan Metal Products designed and fabricated the above tanks for a large meat packer, using plates and heads of Lukens Nickel-Clad Steel.

LUKENS

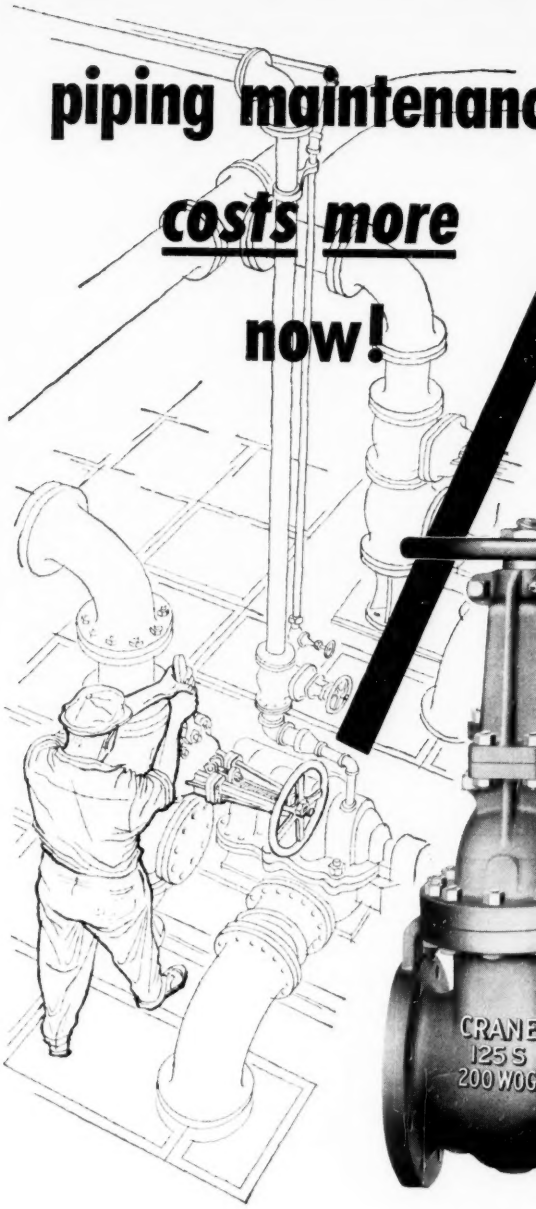
LUKENS STEEL COMPANY

BETTER PRODUCTS FOR BETTER EQUIPMENT

piping maintenanc

costs more

now!



CRANE

VALVES • FITTINGS • PIPE

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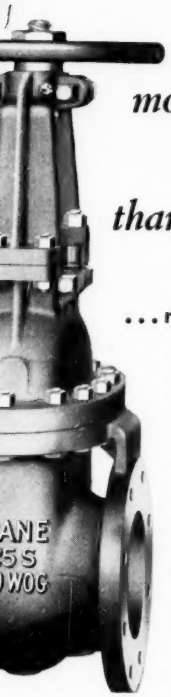
You do less of it

by using Dependable Quality

CRANE VALVES



That's why more Crane Valves are used than any other make

. . . no bonnet trouble with this valve

A typical example of low-maintenance Crane Quality—No. 465½ 125-Pound Iron Body Gates. Rarely does the bonnet joint need attention. Flange construction includes reinforcement to prevent distortion and utilizes more bolts, more closely spaced than is usual in valves of this class. Crane precision-guided seating reduces seat and disc wear. Packing has long life because these valves have a deep stuffing box filled with high grade asbestos ring packing. A ball-type gland equalizes the packing load.

Better performance features like these make Crane the better buy in valves of every type. Ask your Crane Representative for a demonstration.

CRANE CO., *General Offices:*
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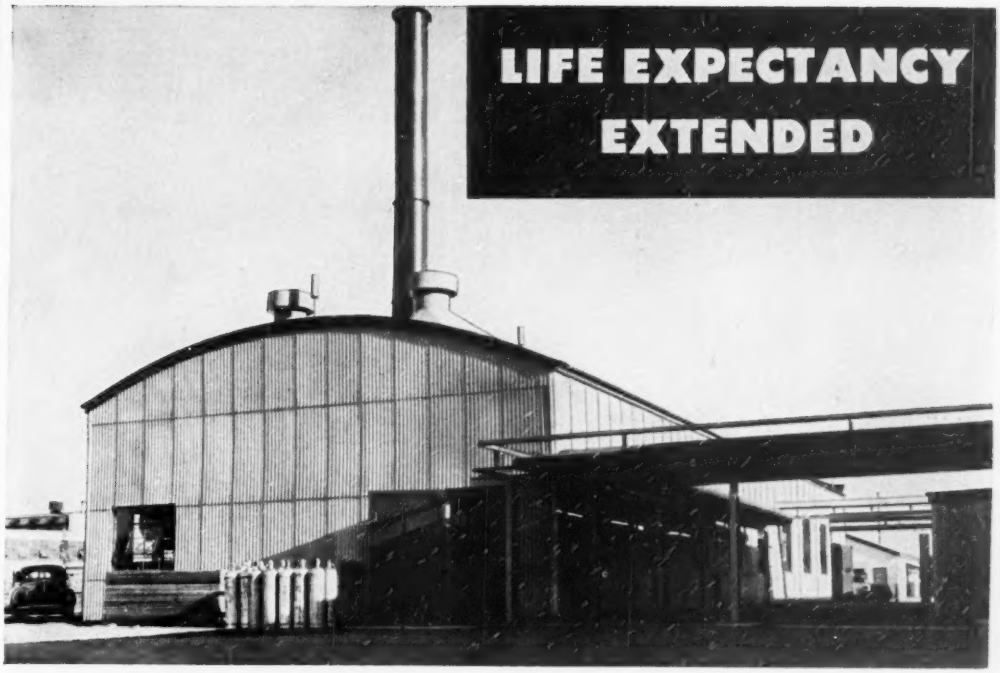

by **K&M** *"Century"*®
ASBESTOS CORRUGATED

Compressor Room of the Birds Eye-Snider Plant at Walla Walla, Washington, is sided with K&M "Century" Asbestos Corrugated Sheets.

The sturdy "clean build" of these compressor plant walls is one sign they'll live long. They're K&M "Century" Asbestos Corrugated, the material you see on more and more industrial and commercial buildings whose owners have made sure of lasting good looks and economy.

K&M Corrugated saves from the start by simplifying and speeding erection. Cutting, drilling, fitting and anchoring are easily done, with every assurance of trim, durable enclosure. What's more, K&M Asbestos Corrugated Sheets—*stay put*. They don't give in to weather effects and fire hazard, nor to rust, rot, rodents and termites. Thus long-term freedom from maintenance goes right along with the initial economy of using K&M "Century" Asbestos Corrugated for siding and for roofs, too.

Whatever your building plans, see how much this adaptable modern material can save you. Write us for full data and the name of your nearest K&M Distributor.

Even scaffolds and extra labor are eliminated when "TOP-SIDE"* fasteners are used. They are made for use with steel members of any type, on sides and roofs.
* ® H. & B. Enterprise Corp.

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They increase truck life . . . they last the life of the truck—that's what operators say about Eaton 2-Speed Axles.

They give extra vehicle miles because the driver has twice the conventional number of gear ratios at his command. He selects the ratio best suited to operating conditions, with less strain on engine and power transmitting parts. The engine runs at peak efficiency, saving gasoline and oil.

Eaton Axles match the truck for durability. The exclusive planetary system permits rugged construction and minimizes load on any one gear or bearing. Wear is reduced by another exclusive feature—forced-flow, positive lubrication.

Get full information about Eaton 2-Speed Axles (on most 1½ ton and larger trucks) from your truck dealer.

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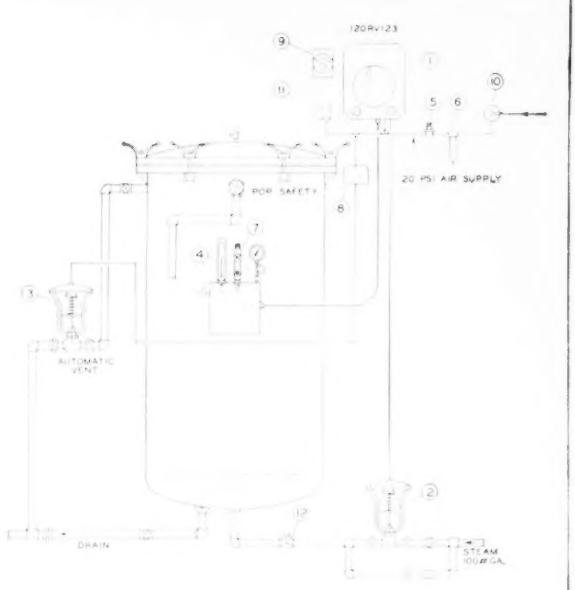
NO DAMAGING AIR POCKETS

with Taylor's brand new Time and Temperature Venting Control



No. S-2V Steam Retort Control System
(For No. 2 cans and smaller)

FOR THE FIRST TIME in canning history, Taylor's new Automatic Time and Temperature Venting Control assures uniform venting of *each* retort load in accordance with NCA Research Bureau recommendations. Adequate venting eliminates air pockets from retort which, teamed with Taylor Time and Temperature Retort Control, assures uniform processing—load after load. Shown above is the Taylor S-2V Retort Control System for No. 2 cans or smaller (System SP-5TV is also available for No. $2^1/_2$ cans or larger).

Without venting on a time-temperature basis, air pockets may form without showing up on your thermometers. Taylor's new venting control "sweeps" out such pockets, producing a uniform steam atmosphere inside the retort.

Typical NCA Research Bureau specifications, which Taylor Automatic Control meets to assure complete product sterilization, are: "One inch venting valve wide open for at least 5 minutes until temperature reaches at least 230°F.", or "for at least 7 minutes to at least 220°F."

This time and temperature venting system can either be added to your present retort control system, or furnished as part of a new system. Ask your Taylor Field Engineer for complete details on the Taylor Automatic Time and Temperature Venting Control best suited to your particular needs. You'll be surprised at the low cost. Taylor Instrument Companies, Rochester, N. Y., and Toronto, Canada. *Instruments for indicating, recording and controlling temperature, pressure, humidity, flow and liquid level.*

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IN HOME AND INDUSTRY

two good ways to—

BEAT THE HIGH COST OF FLAVORING

PEP-O-ROL®
MM&R
Closely approximates the flavor of
BLACK PEPPER

CARD-O-MAR
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Closely approximates the flavor of
CARDAMOM OIL

Low-cost blends of pure Spice Essential Oils...perfected in the laboratories of MM&R!

As the market in Black Pepper and Cardamom grows increasingly critical, more and more food processors are turning to MM&R's *natural* replacements — Pep-O-Rol and Card-O-Mar MM&R. Here are two scientifically perfected oils that can be used *successfully* in place of the spices they duplicate. Yet they cost many times *less!*

Whether you use Black Pepper and Cardamom in crude spice, dry spice or Essential Oil form, you'll be amazed at the ease with which these spices can be replaced in whole or in part by Pep-O-Rol and Card-O-Mar MM&R.

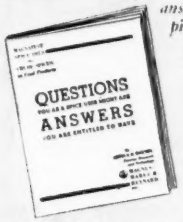
Write MM&R Technical Service Dept. today for full information.

*Contains natural oleoresins as well as pure spice essential oils.

13 reasons why **MM&R MAGNATEST SPICE OILS GIVE BETTER RESULTS**

1. more economical.
2. make it possible to flavor your product uniformly.
3. cannot cause discoloration.
4. do NOT mold.
5. release 100% of flavor immediately.
6. prevent introduction of rodent excreta, hair or pellets, insects or insect fragments, etc.
7. always constant in flavor value
8. easy to measure in exact quantities.
9. take up less storage space than crude spices or flavored salt or sugar.
10. decrease freight expense.
11. prevent losses due to exposure during storage.
12. easy to blend.
13. prevent overflavoring of prepared food products during shelf life.

FREE! *An important technical paper — in the form of questions and answers — that will give you a clear and complete picture of the place of Spice Essential Oils in the flavoring of food products. Write for it now!*



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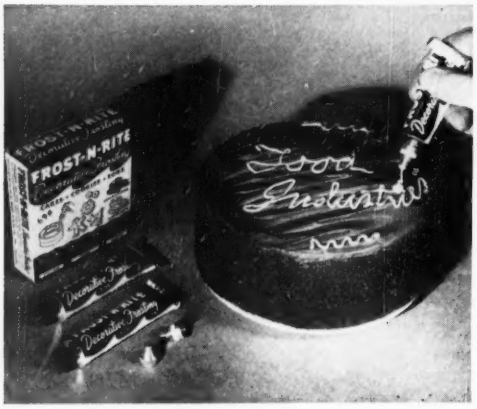
LOS ANGELES: BRAUN CORP. • SEATTLE, PORTLAND, SPOKANE: VAN WATERS AND ROGERS, INC. • SAN FRANCISCO: BRAUN-KNECHT-HEIMANN CO.

New Packages and Products



Decorative Frosting in Tubes

We're not really in practice, but the inscription on the cake in the accompanying photo says "Food Industries." It was written with a decorative cake frosting packaged in collapsible metal tubes—another of the growing number of foods in tubes.

Here Frost-N-Rite Co., Inc., of Chicago, has put up three different colors of frosting—yellow, green, and pink, each in a 1-oz. lithographed tin tube. Each tube is accompanied by a writing nozzle which can be screwed on in place of the cap. In addition to cake, cookies and eggs can also be decorated.

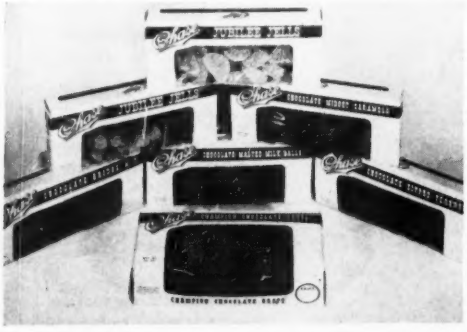
The ingredients in this product are sugar, water, vegetable shortening, invert sugar, vanilla, sodium carboxymethylcellulose, sodium propionate, lecithin, and U. S. certified colors.

The frosting does not have to be stored in a refrigerator, but it should be kept airtight to prevent drying.

Writing nozzles can be washed with hot water.

Clever Line Theme ↓

Varying in depth to accommodate the different candies, these seven windowed boxes maintain brand recognition by measuring same length, width. (Chase Candy Co.)



Two Tiers of Beer ↓

Beer cans in six-unit carriers are here packed double-deck in corrugated container, saving material, dollars. And Robert Gair carton looks good. (Brewing Corp. of Amer.)

"Go-On-Table" T. J. Bottle ↑

Decanter bottle for tomato juice is attractive enough to go right on the dinner table. Makes a good lamp base, too. (P. J. Ritter Co., Bridgeton, N. J.)

Quick-Opening Cookie Box ↑

Housewife doesn't have to wrestle with cookie box anymore. Named the Quick-Zip package, it's opened with a cellophane rip tape. (Grocer's Cookie & Biscuit Co., Detroit)

WORTHINGTON REFRIGERATION REPORT

WORTHINGTON PUMP AND MACHINERY CORPORATION
HARRISON, NEW JERSEY

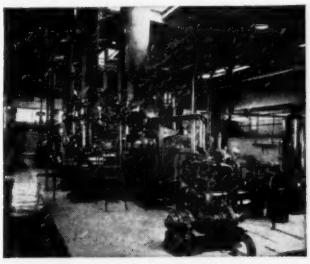
Specialists in air conditioning and refrigeration for more than 50 years

Ice-Making Fuel Cost Reduced by 40%

The Pacific Fruit Express Co. has an ice manufacturing and storage plant at Tucson, Ariz. for servicing perishable produce shipped by rail. This plant operates 24 hours per day and has a capacity of 250 tons daily during the peak season. They can ice 160 cars, 80 on each side of the platform in one spot.

The Worthington LTC-4 Gas Engine-driven Compressor installed at this plant is more economical than the steam-driven compressor it replaced, having reduced fuel cost by 40%.

The Worthington Compressor was installed in April, 1948, and is used for recirculation of ammonia gas in refrigeration plant. This 500 hp, 300 rpm machine runs an average of seven months per year, 24 hours per day and has given trouble-free operation.



Main engine floor showing Worthington LTC-4 Ammonia Compressor driven by a Worthington gas engine.

Nothing Too Good for the Pigs

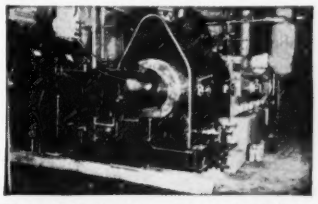
John Morrell & Co.—one of the largest pork meat producers in the world—has always been alert to technical progress. It was the first to wrap hams in parchment paper, first to pack lard in paper cartons, one of the first to install the revolving smokehouse.

When the company decided to increase the general refrigeration capacity of its plant at Ottumwa, Iowa, Worthington equipment was selected on the basis of favorable comparative operating cost figures.

That was over ten years ago, and the Worthington two-stage ammonia compressor is still operating in a highly satisfactory manner, in respect both to operating cost and absence of trouble.

Cold storage room at John Morrell & Co.'s Ottumwa plant.

This compressor operates 24 hours a day with shutdown only during the coldest month for annual overhaul. It provides refrigeration for both freezing and storage (0 to 15 F).



Type ODU Uniflo steam-driven Worthington ammonia compressor.

Fully Automatic Refrigeration for First National Stores

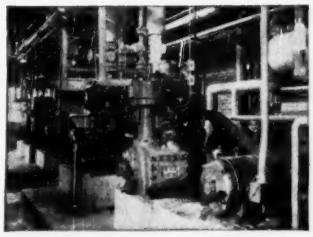
About 300 stores of the vast northeastern network of First National Stores are served by the warehouse in East Hartford, Conn.

This warehouse has recently been expanded by the construction of refrigerated compartments for banana ripening, meat storage and assembly, and cooling of pork products, corned beef and chicken.

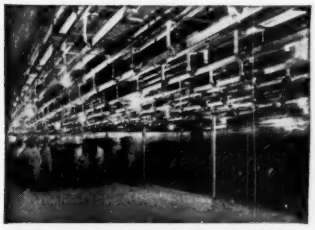
A fully automatic system of refrigeration has been installed. It produces about 80 tons of refrigeration, and includes the following Worthington equipment: four 7 x 7 ammonia compressors, two 16 x 12 condensers, one 12 x 9 condenser, two 16 x 16 brine coolers, one 12 x 9 brine cooler.

There are two levels of brine refrigeration, one at minus 15 F, one at 12 F. Defrosting is done by hot brine in rooms served by pipe coils and by water in rooms served by product coolers.

Architect: Ganteaume and McMullen, Boston. Installation by Harding and Gross, Cambridge.



Four Worthington 7 x 7 VSA ammonia compressors. Condensers in background, brine coolers overhead.



Meat storage room—part of new addition to East Hartford warehouse of First National Stores.

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A complete line . . . in which *all* the vital components are made, not just assembled by Worthington. For more worth with Worthington, see your nearby Worthington distributor (consult Classified Telephone Directory).

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If You Package Candies, Crackers, Cookies, Potato Chips, Pretzels—OR SIMILAR PRODUCTS, Wright Automatic Weighers With Exclusive HY-TRA-LEC System Can Do A More Accurate Job for You at High Speed with Less Labor!

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Used by America's leading food, confectionary and bakery firms, HY-TRA-LEC net weighs and fills a wide variety of dry products into ANY TYPE container with Superior Accuracy! RANGE: ½ Ounce to 16 Ounces. Single or Multiple weighing heads. Fully automatic layout for rigid containers. Semi-automatic layouts when bags are used or when manual placement of containers under discharge spout is desirable.

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Other standout machines in the Wright line include May-Plex cellophane wrapper for cracker sandwiches, Strip Stamper for applying revenue stamps to liquor bottles, and widely used machines for the tobacco industry.

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COMPANY SALES OFFICES: JERSEY CITY · CHICAGO · DURHAM WEST COAST REP.: KING & ANDERSON, SAN FRANCISCO SOUTHWEST REP.: R. P. ANDERSON COMPANY, DALLAS CENTRAL REP.: HAL HUDSON EQUIPMENT COMPANY, TOLEDO EUROPE: SPERRY GYROSCOPE COMPANY, LTD., LONDON

Distinctive 10¢ Pack

Rockwood & Co.'s recent 10c. packages of nonpareil, mint and rum wafers are, we believe, three excellent examples of how to achieve a quality item in the low-price candy field. In addition, the packages bear a close resemblance to the firm's larger designs.

The outer cardboard has been folded in six places, resulting in a unique five-sided front with a flat back. Inside, there is a complete cellophane envelope that both cushions the candy against damage and provides a "see-the-product" window. Picture shows detailed construction of flat. Cellophane is "tacked" to the cardboard.

All three packages contain 13 wafers which are held at about a 45-deg. angle—another distinctive feature. This also enables candy to slide out freely.

Concentrated TJ

Tomato juice has recently joined its contemporaries in a frozen concentrated form. Birds Eye-Snider Div., General Foods Corp., is currently marketing a 6-oz. tin which will reconstitute to 1½ pints. College Inn Food Products Co. was scheduled to have a similar, but more highly flavored, product on the market by now.

The Birds Eye juice is not subjected to heat during processing. It is reported to have the delightful tang of fresh tomatoes. Since it is a concentrate, it can also be used for soups, sauces, gravies and aspies. There is no separation of solids and juices when reconstituting, so consumers may vary the thickness of juice.

Present distribution will be limited to the Northeast until additional supplies and equipment can be acquired.

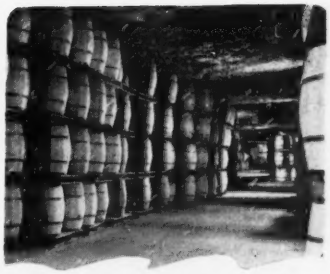
Since both General Foods and College Inn have done considerable research on the tomato concentrating problem, the food industry is watching these two products with interest.

Pressurized Batter

A fascinating new product and package is this ready-to-use pancake and waffle batter—called PanWaff,—held under pressure in a metal container. It goes directly from refrigerator to griddle, no preparing, no additions.

Sealing under pressure is accomplished with carbon dioxide. A special dispensing cap, easily operated by housewife, releases the batter. She merely puts her finger on it and the batter flows freely.

The batter is being made by PanWaff, Inc., Minneapolis, Minn. Details of processing were not indicated. However, pasteurized buttermilk and whole eggs are used in the product.



Gigantic Underground Storage Uses

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Originally a limestone quarry, the Natural Cooler Storage of the U. S. Dept. of Agriculture near Atchison, Kansas, is one of the largest refrigerated warehouses in the world, having capacity for 3,000 carloads. A temperature of 32 degrees F. is held in the great cave by two Frick 4-cylinder compressors, driven by motors totaling 600 horsepower.

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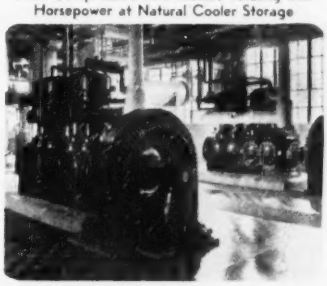

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Frozen Foods in Foil

Excellent product protection and a good looking package for frozen foods—strawberries in this instance—have been achieved with a printed lamination of foil, paper and tissue. Used by the Southern Freezing & Preserving Co., Dayton, Tenn., it is termed a distinct advance in frozen food packaging.

A thin layer of wax between the parchment and tissue "strikes through" the tissue when run through the heat-sealing mechanism. This completely seals the package. And, of course, the foil itself is extra assurance of product quality.

Shellmar Products Corp., Mt. Vernon, Ohio, furnishes the wrappers.

Fresh Sweetened Coconut

A new sweetened coconut, claimed to remain fresh, tender and white until actually consumed, has been announced by Durkee Famous Foods, Cleveland.

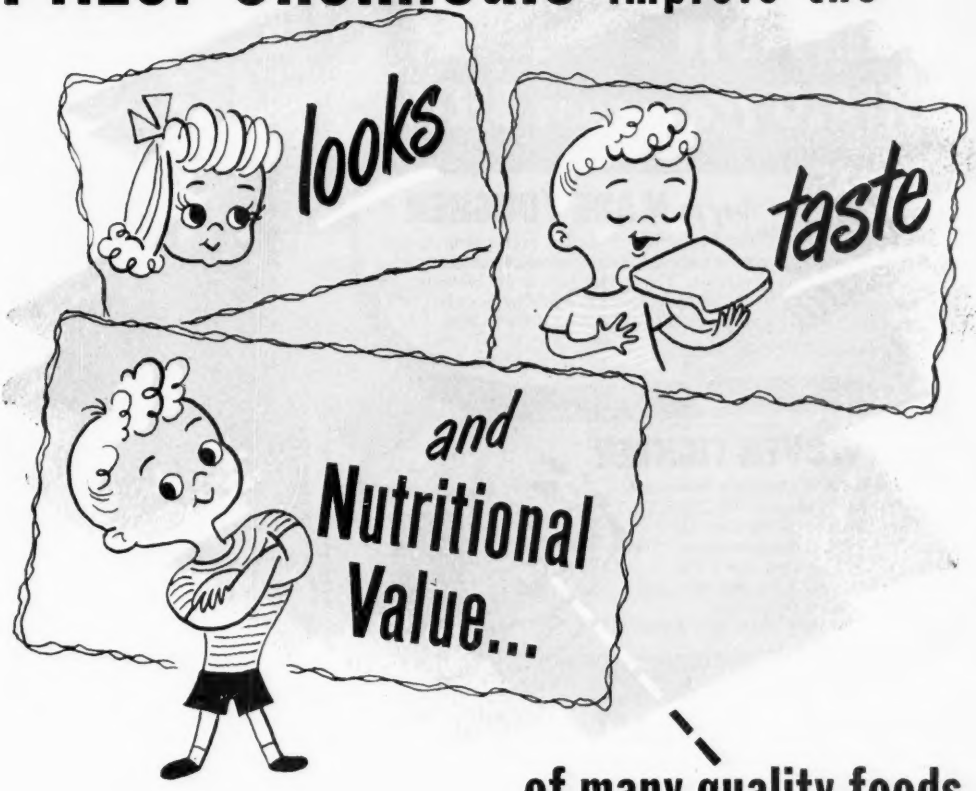
Called Stayfresh, it holds about the same moisture as fresh coconut, while retaining a conventional sweetened coconut texture and appearance. Special bag of cellophane, kraft and foil laminate insures freshness. These will be offered to food processors in 25- and 50-lb. sizes.

Just Like Human Milk

A medical report on 171 babies fed from birth on a powdered synthetic breast milk made by the Borden Co. states that progress on such a diet can equal and sometimes excel that of infants actually breast-fed. The report is in the September issue of *The New York State Journal of Medicine*.

Called Bremil, the new powdered infant food has its calcium-phosphorous ratio adjusted to the pattern of human milk. It has the same amount of fat as breast milk—employing a blend of palm, coconut and peanut vegetable oils. In addition, Bremil is stated to have the same amino acid pattern and carbohydrate, with

Pfizer Chemicals improve the



of many quality foods

• Appetizing appearance sparks the initial sale. The smooth velvety texture of many processed cheeses is a direct result of the efficient emulsifying action of Pfizer Sodium Citrate or Sodium Gluconate.

The remembrance of delicious taste reaps many a repeat sale. Pfizer Citric and Tartaric Acids add a tongue-tingling tartness to jams, jellies and preserves that just balances the sweetness of sugar and enhances fruit flavor.

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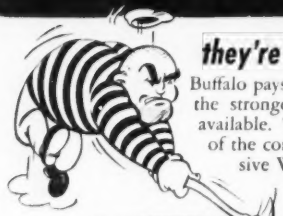
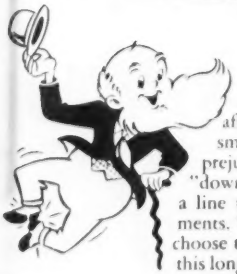


they're MADE TOUGHER

Buffalo pays the top dollar, everywhere, to get the strongest, stoutest, sturdiest cotton yarn available. This quality yarn is the backbone of the conveyor belts made by our exclusive WOV-IN-WEAR PROCESS.

they're WOVEN TIGHTER

WOV-IN-WEAR is a unique belt weaving process that is our own EXCLUSIVE development. No, there isn't any big mystery to it! It's just that we have drawn on our more than half a century of experience to come up with a loom design that *actually weaves belts tighter.*



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zero curd tension, as found in breast milk.

In the synthetic milk, vitamins A and D, thiamine, riboflavin, niacin and ascorbic acid have been standardized at or above the recommended daily requirements for infants.

Company is packaging the new milk in a 1-lb. can, on sale in drug stores.

Formosa Oolong Back

Tea drinkers can now secure their one-time favorite, Formosa Oolong tea, which practically disappeared from the market during and since World War II. Imported by the Sembodja Corp., New York City, this China-Leaf tea is now being marketed in the east and midwest, with national distribution expected soon.

Processed in Formosa, the tea is packaged in New York. It comes in an eye-catching aluminum foil laminated ¼-lb carton.

Package & Product Shorts

New Evaporated Milk Can

Recently developed for evaporated milk is a can with a gold-type lining. It has been adopted by Meyenburg Milk Products Co., San Francisco. The inside of the can will not rust before or after opening, and the smoother lining should reduce consumer wastage through adherence.

Packaged Crab Seasoning

Another claimed first is "Crab Boil," a packaged seafood seasoning. Just add boiling water to form the seasoning and employ it on crabs or shrimp. It's put up by the New Orleans Import Co.

Frozen Whipped Potatoes

Now being introduced in New York and New Jersey after extensive test marketing, are frozen whipped potatoes. Processor, Birds Eye-Snider, boils, mashes and whips the spuds before freezing. For serving, just heat for about 25 min., no defrosting.

—*End*

Some things give solid satisfaction

When the ball hooks in for a perfect strike, and you hear the murmur of approval around you—comes a feeling that can't be beat. That's how it is, too, when you know you've given your product the best in quality and skill from start to finish.

Naturally, you've used sugar. In years of quality manufacturing, you've learned that sugar's standard is uniformly high and pure . . . sugar has more sweetening power . . . only sugar brings out best the natural flavors of higher-priced ingredients.

To keep your product ahead of the game—you'll always use sugar. For you and your customers, it pays off in solid satisfaction!

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USES *BOTH* TRANSMITTED AND REFLECTED LIGHT

For the first time, a hand refractometer is now available that uses either reflected or transmitted light—transmitted light for clear, transparent solutions . . . reflected light for dense, opaque or turbid samples.

FOR QUICK, ACCURATE ANALYSIS of citrus or vegetable juices . . . for easy on-the-spot checking in the plant or in the field . . . the new Bausch & Lomb Juice Refractometer is an ideal instrument.

DIRECT READING with no interpolation necessary. A precise scale, from 0 to 25% total solids, provides for readings made directly with high accuracy. Scale lines alternate on each side of the center line, even tenths on one side, odd tenths on the other . . . avoiding a crowded scale.

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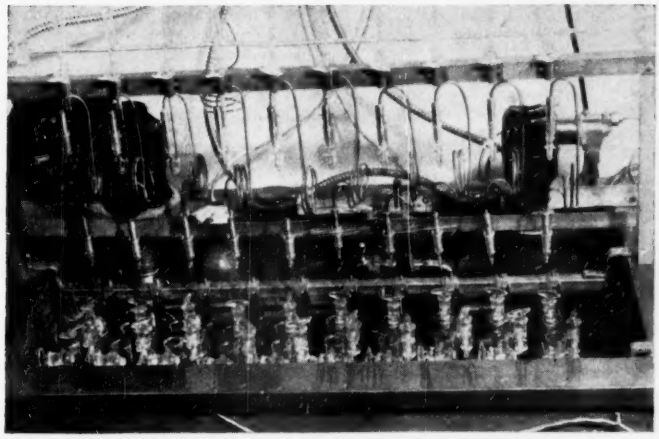
BAUSCH & LOMB *Juice* REFRACTOMETER

New Technology



New Solutions Developed By Bureau of Standards To Extend Accuracy of pH Range

Four solutions that extend the accuracy of the pH standard scales, to conform with the 3 middle-range standards now distributed to the chemical industry, have been selected by chemists of the National Bureau of Standards.

To encourage adoption of a universally accepted scale of acidity, analogous to the International Temperature Scale, the Bureau has, for several years, distributed 3 standard samples of known pH. These fix the scale at pH 4, 7, and 9. However, this scale is not uniform at its ends, resulting in errors of measurement at low and high pH—0.02—0.05 units low at pH 11 or above, and as great as $\pm$ 0.03 units at pH 2.5.

In the course of the recent work 41 solutions were examined. Out of these the following 4 were selected:

1. A mixture of $NaHCO_3$ and Na_2CO_3, both at 0.025 molar concentration, with pH about 10 at room temperature.
2. A 0.01 molar solution of trisodium phosphate, pH about 2.1.
3. A saturated solution of potassium hydrogen tartrate, pH about 3.6.
4. A 0.01 molar solution of potassium tetroxalate, pH about 2.1.

The new standards lengthen the accurate portion of the scale in both directions. However, the measured pH of highly acid or alkaline solutions may be in error as much as $\pm$0.03.

The Bureau plans to add the potassium hydrogen tartrate and the potassium textroxalate to the samples it issues as soon as an adequate supply of the purified materials has been obtained.

Digest from "New pH Standards," NBS Technical Release 1472, National Bureau of Standards Washington 25, D. C.

FRUITS

Frozen Fruit Purees Used in Ice Cream

Offering an outlet for surplus fruit, and providing the ice cream manufacturer with a new high-quality flavor base at reasonable cost, frozen fruit purees seem likely also to gain acceptance in frozen desserts. These purees are easily prepared with a minimum amount of grading and culling of fruit, although the latter must be sound, and free from mold, decay, fermentation, and spray residue. Equipment used should be made of stainless steel or glass. Sugar is added in the ratio of 3 to 5 parts by weight of fruit to sugars. High quality purees can be made from a great variety of fruits, including citrus as the latest addition to the list. Their principal use is in the manufacture of frozen desserts. One such, the formula and name of which have been filed in the U. S. Patent Office by the Dept. of Agriculture, calls for 60 percent fruit puree, 25 to 30 percent added sugar, 0.5 percent gelatin stabilizer, and not to exceed 10 percent water, added with the gelatin. Citric acid in amounts up to 0.25 percent may be added to purees of bland flavor. No artificial flavor or color is needed or permitted. Anyone is free to use the formula and name if he adheres to the specifications. Sundae topping is another use for purees if they are stabilized with citrus pectin and sugar.

Digest from "New Developments in the Use of Frozen Fruit Purees and Other Fruit Products in Ice Cream," by D. G. Sorber, WRRL., Albany 6, Calif., a paper presented at the 1950 State College of Washington Institute of Dairying, Pullman, Wash.

Spearmint Oil From Citrus Peel

Synthetic spearmint oil which is indistinguishable in odor and taste from the natural product has been produced from *d*-limonene, a chemical which constitutes about 95 percent of orange and grapefruit oils. The process consists of converting *d*-limonene to *l*-carvone which occurs to the extent of 65 percent in natural oil of spearmint and possesses the characteristic flavor of the oil.

First step in the process involves formation of limonene nitrosochloride. This is dehydrochlorinated to form carvone oxime from which *l*-carvone is

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prepared by acid hydrolysis. Yield on a large size (25 lb.) run was slightly more than 12 percent. Steps employed in the process are carefully explained and supplemented with five tables and one chart.

Digest from "*l*-Carvone From *d*-Limonene," by Carl Bordenca, Rufus K. Allison, and P. H. Dirstine, a paper presented before the Div. of Ind. & Eng. Chemistry, ACS. Chicago, Ill., Sept. 4, 1950.

DAIRY

Dry Skim Milk In Home Recipes

Promoting the housewife's use of dried milk preparations, experiments have been made with common household recipes to which non-fat dry milk was added. Tests included white sauces, cream soups, custards, eggnogs, chocolate puddings, waffles, and angel, butter sponge, and plain butter cakes.

In preliminary work, viscosity of thin pastes and gel strength of thick pastes were studied when dry skim milk was added to mixtures of flour, water, or fluid milk. Viscosity and gel strength were increased in proportion to the amount of dry milk used, and it was possible to predict the gel strength of a mixture of different proportions from line graphs. Addition of sugar decreased gel strength of thick pastes, and increased the viscosity of thin pastes. Addition of fat decreased gel strength in heavier pastes, but had no effect on viscosity of thin pastes. Alteration of pH to 6.0 decreased gel strength in thick pastes, and resulted in curdling thin pastes.

In testing household recipes non-fat dry milk was used successfully to fortify all the products studied. Nutritive value was improved because dry skim milk is high in protein and other dietary essentials. The optimum amount of dry milk was determined for most of the products studied.

Digest from "Use and Properties of Non-Fat Dry Milk Solids in Food Preparation. I. Effect on Viscosity and Gel Strength, and, II. Use in Typical Foods," by L. M. Morse, D. S. Davis, and E. L. Jack, *Food Research*, Vol. 15, 200-15, 216-22, May-June, 1950.

FATS AND OILS

Antioxidant Properties Of Synthetic Sesamol

Continuing the study of sesame oil, investigators have determined the antioxidant activity of synthetic sesamol with lard and refined peanut, cottonseed, and sesame oils as substrates. The inhibitory action of sesamin, sesamolin, and phytosterol obtained from sesame oil was also determined. Antioxidant activity was determined by the active oxygen method at a temperature of 97.7 C.

The different compounds tested were dissolved directly in the lard or vegetable oil substrates. Phosphoric and citric acids, when used, were added in the form of alcoholic solutions containing 1 mg. 85-percent phosphoric acid and 1-mg. crystallized citric acid per ml., respectively. The time in hours required to reach a peroxide value of 20 and 100 milli-equivalents per kg. of lard and vegetable oil, respectively, was taken as the "keeping time."

Using the protective action of nordihydroguaiaretic acid in a concentration of 0.01 percent for comparison, which gave a keeping time of 20 hr. for lard, it was observed that the same concentration of sesamol gave a keeping time of 23 hr. The antioxidant efficiency of sesamol continued to increase with increasing concentrations, even at high levels—showing a stability of 115 hr. at a concentration of 0.50 percent. Both phosphoric and citric acids had a pronounced synergistic effect on the antioxidant action of sesamol in lard. Sesamol was also appreciably active in its effect on vegetable oils, the greatest response being obtained on sesame oil. Sesamin, phytosterol, and sesamolin, and a combination of the last with phosphoric acid, showed no significant antioxidant activity in lard.

Digest from "Sesame Oil. III. Antioxidant Properties of Sesamol," by Pierre Budowski, *Journal of the American Oil Chemists' Society*, Vol. 27, 264-67, July, 1950.

CONFECTIONERY

Controlling Consistency Of Fondant Cream

Since quality of fondant cream largely depends upon its consistency, it is important to know the factors influencing this property, and possibilities of varying them.

Two methods are available for varying the composition of the cream: By increasing the water content, or the quantities of glucose plus invert sugar. The former is accomplished by adding water-retaining agent such as agar-agar, frappe, fruit pulp, pectin or dried milk; the latter by adding invertase.

If agar and frappé are added, the cream center develops a hard crust with low water content suitable for dipping in chocolate. The inner part still has a high water content which diffuses through the entire filling after dipping. If fruit is added in a suitable way, water is emitted from their

cells and the cream becomes gradually softer.

When invertase is added, the sucrose will hydrolyze forming invert sugar which enters into the liquid phase. During drying the volume of this phase decreases and the cream becomes firmer. A crust having a low water content (5-6 percent) is formed. After coating with chocolate, the water will be distributed and the cream becomes homogeneous, with a liquid phase between 35 and 45 percent. When invertase has acted upon the cream, the liquid phase volume will be 50 percent or more, and the cream will soften.

Digest from "Fondant Cream," by Wilhelm Andersson, *Food Processing, Packing, Marketing*, 33 Tothill St., Westminster, London, S.W.1, 283-85, Aug., 1950.

ENGINEERING

New Direct-Steam Unit Heats Foods Quickly

Designed to overcome many of the disadvantages of quick-heating devices heretofore used for raising the temperature of liquids by steam injection, a patented process effects efficient heat transfer by use of a special apparatus. Briefly, the apparatus comprises a closed chamber in which is mounted a high-speed agitator capable of causing marked turbulence in the treated material, and into which is directed a multiplicity of streams of relatively low-velocity steam.

Success of the operation is believed to lie in the fact that the high-speed impeller cuts the steam streams into small segments, preventing the formation of large bubbles or envelopes of steam. Heat transfer is almost instantaneous, condensation of steam is rapid, and vibration and noise due to collapse of large steam bubbles are eliminated.

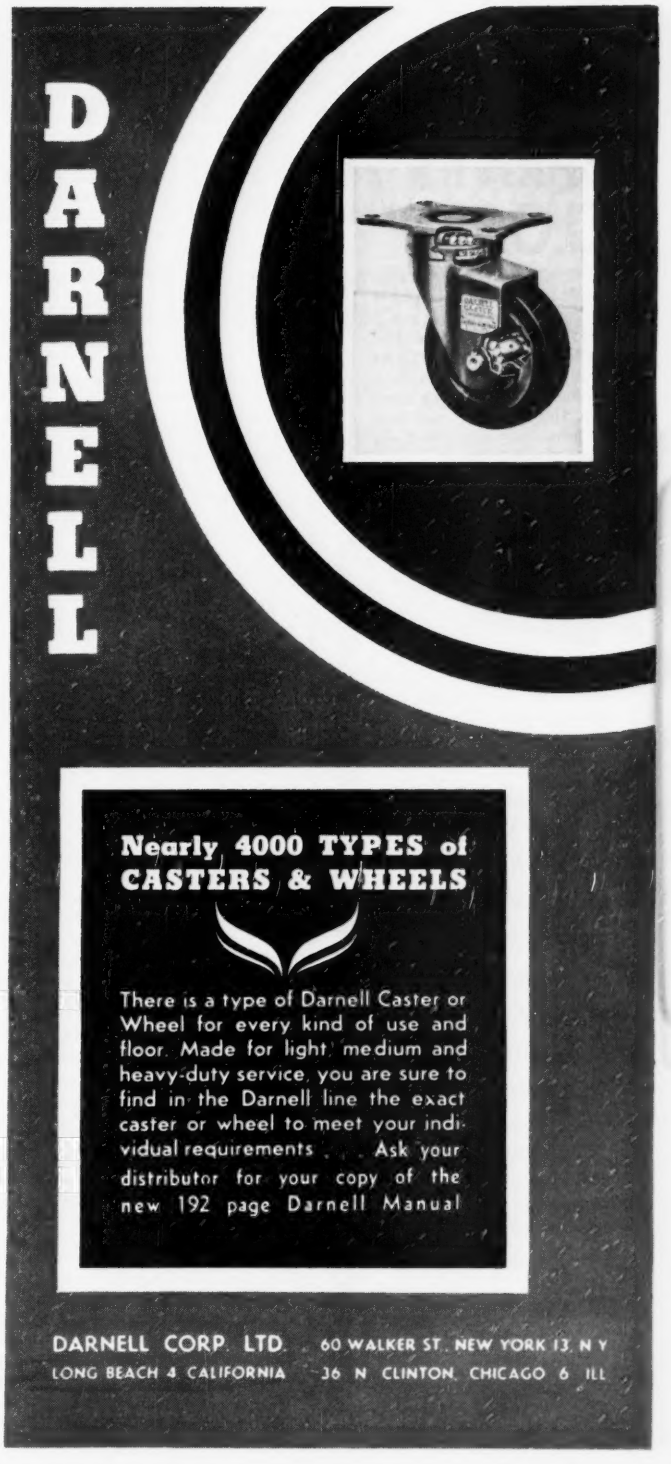
The process can be applied to milk, milk concentrates, corn syrup, molasses, and like viscous materials. Starting temperature is relatively unimportant, and steam can be used at temperatures as high as 350 to 400 F. without deleterious effects.

Digest from U. S. Patent 2,492,635, issued Dec. 27, 1949, on an application dated Jan. 17, 1947, to Le Roy R. Hawk, San Francisco, Calif., assigned to Golden State Co., Ltd., San Francisco.

SANITATION

New Dairy Plant Laboratory Designed for Easy Cleaning

Regarded as a model on which the company's other laboratories will be patterned, a western control laboratory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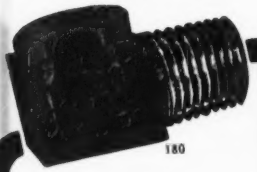

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In many Food Processing plants Monarch Spray Nozzles are used to . . .

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RINSE VEGETABLES
POWDER MILK
DRY EGGS
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BANANA ROOMS

Remember

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for dairy products has been so planned that cleanliness is easy, simple, and almost automatic in every detail. Innovations are found in arrangement and in the use of dirt-resistant surfaces. Typical of the former is the "butterfat island" in the center of the laboratory where Babcock units, incubator, and centrifuge are easily accessible for cleaning, instead of being placed along walls or in corners as usual. Work surfaces have been made resistant to moisture, lactic and sulphuric acids. Tiled floors are curved into tiled walls, and are laid with a grade that insures drainage to one corner of the room. Piping and conduits are housed out of sight, thus doing away with troublesome dirt catchers. Micarta trimmed with stainless steel covers the plating table and other work surfaces. At the refrigeration units, work surfaces, shelves, and gratings are of stainless steel. Good housekeeping is made easy by providing cabinets, enclosed shelving, and drawers for all apparatus which is put away at the end of the day, thus leaving the laboratory looking clean and tidy. Special attention has been given to lighting and electric outlets, and an adequate supply of hot water.

Digest from "Sanitation at Golden State Product Control Laboratory," by Elsa Gidlow, *Modern Sanitation*. Vol. 2. 14-16. July. 1950.

MICROBIOLOGY

Contaminated Bottle Crowns

There can be a quite heavy infection of bottle crowns with organisms whose presence can be easily demonstrated by applying the crowns to a bottle containing sterile water and shaking the bottle for a few minutes. The crown is then removed and replaced with another and the shaking repeated until a hundred crowns have been used. The water is then plated on a suitable medium (hopped beer-wort agar, for example, if the test is for organisms that will grow in wort or beer).

In a series of such tests, mold and bacteria were most frequently found, with yeasts showing up on only one type of crown. The nature of the "spot" (or its absence) made little difference, though aluminum spots were sterile on two sets of tests. None of the organisms found would grow on beer, hence crowns were judged not to contribute to biological instability.

That crowns are infected with organisms can also be shown by incubation in a warm moist atmosphere. Under these conditions the crowns often become moldy and show high counts. New crowns are likely to have very few organisms. To preserve them in the best condition, they should be stored in a clean, cold place, preferably with a humidity of 70 percent. It is also inadvisable to carry a stock of crowns for long periods.

While crowns ordinarily do not contribute to beer infections, in food products containing more sugar and marketed without pasteurization, they could be a factor in spoilage.

Digest from "The Influence of Bottle Crowns on the Biological Stability of Beer," by A. Juillerat, *Schweizer Brauerei-Rundschau*, Vol. 61, No. 4, 55-58, Apr. 1950.

MISCELLANEOUS

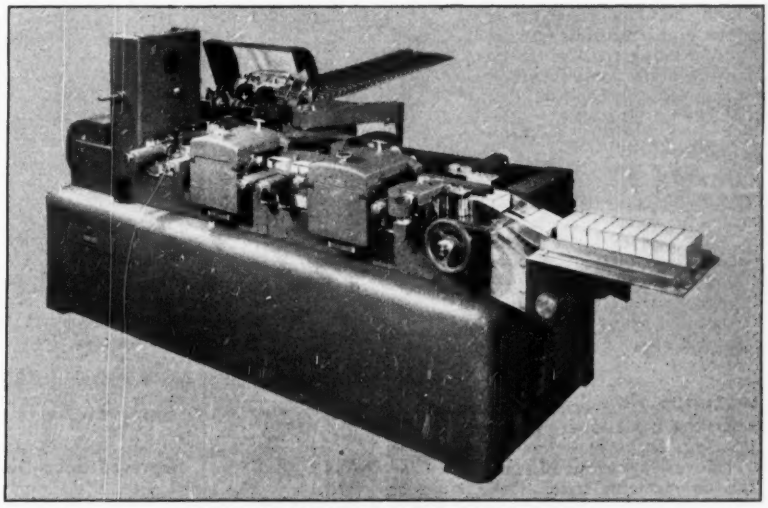
Amino Acids Are Involved In Browning of Foods

The Maillard reaction between the sugars and amino acids can be either beneficial or harmful. For example, the color and flavor of beer, bread, and maple syrup are partly due to it. Adverse effects are stale, caramelized odors and tastes, loss of protein stability and solubility so that dried foods no longer reconstitute properly with water, increased tendency to froth or foam, and reduction in the nutritive value of the protein. Browning reactions occur in products high in protein, low in sugar and alkaline in reaction, such as egg white, as well as in high sugar, low nitrogen, acid foods such as orange juice, and therefore must be very diverse in their nature.

Mixtures of casein and carbohydrates of various kinds, held for periods up to 16 days, showed that pentoses and glucose, sustained high amino acid nitrogen losses. Disaccharides were less reactive and fructose reacted very slowly. A moisture content of 13 percent (corresponding to 65–70 percent relative humidity) accelerated the combination of sugar with amino acid, while very dry states, and aqueous solution retarded it. High pH and high temperature also encouraged it. At first only lysine seemed to be bound in a 1:1 ratio with glucose. Later, other amino acids were held by the sugar and the ratio of glucose to amino acid nitrogen went as high as 9, after 16 days at 98.6 F. The nutritive value of the protein for young rats also fell off decidedly.

Sometimes browning can be prevented or retarded by the elimination of one of the reactants. For example, the fermentation of egg-white before drying gets rid of the 3.5 percent of glucose it contains. Sometimes varieties low in amino acid nitrogen can be used, as in the case of potatoes. Low temperatures, low pH, and low moisture are often helpful. Packing in inert gases has no primary effect on the reaction but may help in holding

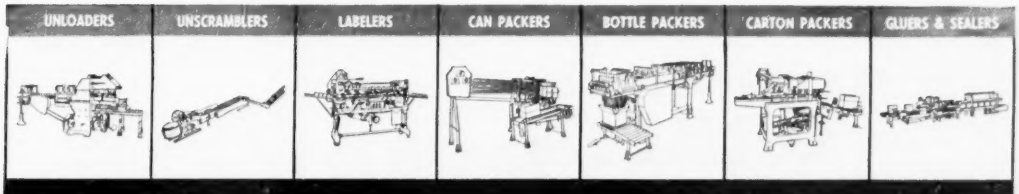
STANDARD-KNAPP EXPANDS ITS FAMOUS LINE TO INCLUDE ROCKWELL CARTONING MACHINES



FULLY AUTOMATIC CARTONING MACHINE
— formerly known as Rockwell Cartoning Machine

STANDARD-KNAPP has acquired the entire line of machinery and equipment formerly produced by Rockwell Packaging Machines, Inc. Designed for versatility, these machines will now be backed up by the engineering, manufacturing, sales and service facilities of the Standard-Knapp organization.

We are prepared right now to discuss the installation of cartoning machines in any plant. Inquiries are invited concerning the application of these and other machines in the Standard-Knapp line to your packaging problems.



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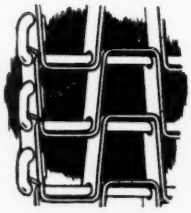
SAVE MONEY on these Sanitation Tasks

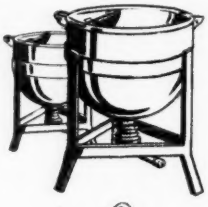
for example:

CONVEYOR BELT CLEANING: (metal, rubber, canvas). Oakite Steam-Detergent Cleaning with the Oakite Gun has it all over laborious manual methods. Cuts cleaning time and cleaning costs to the bone. Informative literature on conveyor-belt maintenance (cleaning, descaling, derusting) yours FREE on request.



for example:

KETTLE CLEANING: (copper, aluminum, stainless steel). Burnt-on deposits on the inside, tarnish on the outside—makes no difference, there are specialized Oakite cleaning compounds designed to remove the most troublesome baked-on deposits quickly, thoroughly, safely. Interesting facts on "beauty-treatment" for kettles yours for the asking.



for example:

FLOOR WASHING: (cement, wood, rubber, tile). Oakite has cleaners for every type of flooring. Each compound is designed to remove heavy ground-in grease, grime, fruit or vegetable stains. Oakite-cleaned floors are film-free . . . safe to walk on. And Oakite-cleaned floors last longer. The Oakite story on economical floor-washing gladly mailed free on request.

Get MORE for YOUR Cleaning Dollar: If you are interested in getting more for your cleaning dollar make your supply source—Oakite. You can be sure of getting good materials where a little will go a long, long way. You can be sure of getting service . . . in-plant service from a man who knows his job . . . knows where and how to save you money on any cleaning, descaling or derusting need that may arise. So consult Oakite first on "Stem-to-Stern" sanitation. For name of your nearest Oakite Technical Service Representative write address below.

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back secondary decomposition. Chemical inhibition has not been effective generally though the action of SO_2 on fruit and vegetable products may be in part on inhibition of the browning reactions.

Digest from "The Role of Amino-Acids in the Deterioration of Food: The Browning Reaction," by C. H. Lea, *Chemistry and Industry*, 155-58, March 4, 1950.

Lobsters Pre-Heated Before Freezing

Claiming to overcome the disadvantages and expense of live storage, and the unsatisfactory results hitherto obtained by quick freezing or cooking and canning, a patented process offers a new method for preparing lobsters for cold storage.

With this method, live lobster or fresh raw lobster in the shell is heated briefly to sear the skin of the meat next to the shell, after which it is quick frozen. The preferred heat treatment is immersion in boiling water for not less than 15 sec. nor more than 5 min., depending on the shell thickness.

After heating, the lobster is cooled and quick frozen at a temperature of −15 to −25 F. When packed in a moisture-proof container, the lobster will keep indefinitely at a storage temperature of +5 F. The cooked meat has the tenderness, flavor, and color of live-cooked lobster, and slips freely from the shell.

Digest from U. S. Patent 2,501,655, issued Mar. 28, 1950, on an application dated Aug. 7, 1947, to W. M. Altenburg, Portland, Me., and assigned to GI's Incorporated.

Improved Bake Oven

Special construction of a bakery oven, recently patented, has for its object better control of the rising of the bread, condensation of water vapor on the surface of the dough, and production of a crispy brown top crust. These results are accomplished by means for producing and maintaining atmospheric conditions in the oven, chiefly means for mixing air and steam and introducing the mixture at an entering temperature at which the mixture is at least as dense as the air which is in the oven.

This mixture should have a dew point of about 200 F. With the dough entering the oven at about 90 F., the temperature gradient which causes the flow of heat from the mixture to the dough, and which in turn causes the condensation, is adequate for the purpose.

Digest from U. S. Patent 2,502,172, issued Mar. 28, 1950, on an application dated Nov. 14, 1945, to Edward H. Paulsen, Sea Girt, N. J., and assigned to Edward H. Paulsen, White Plains, N. Y.

—*End*

FOR LEAKPROOF, TROUBLE-FREE PIPE RUNS

Cut-a-way view of a Walseal Tee showing ring of silver brazed alloy, and completed Silbraz joint.

Specify Walseal* Products

On all types of piping jobs where Type "B" copper or red brass pipe is used, trouble can be avoided by installing Silbraz* joints — made with Walseal valves, fittings and flanges.

Threadless, patented Silbraz joints are silver brazed (not soft soldered) pipe joints that are leakproof, trouble-free — permanent . . . connections that will not creep or pull apart; that literally join with the piping system to form a "one-piece pipe line". Thus, these modern joints eliminate the need for maintenance and costly repairs — especially important where lowered operating costs are imperative.

For complete details on the modern Silbraz joint, made with Walseal products, write for a copy of Walworth Circular 84.

**Patented — Reg. U. S. Patent Office.*

Recommended for

- **Hot and Cold Water Circulating Systems**
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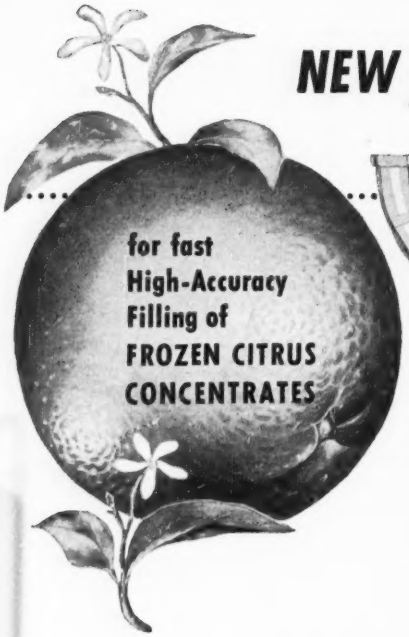
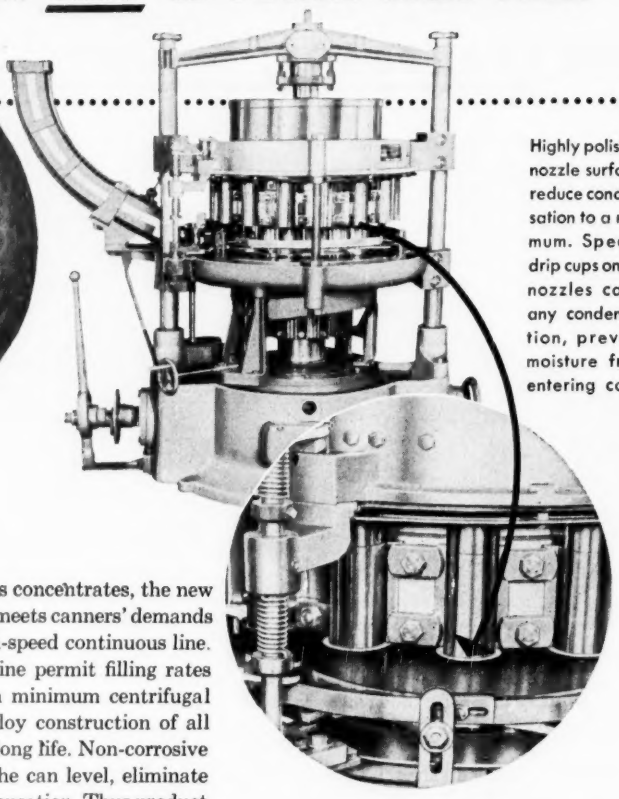
NEW fmc 15 Pocket M&S Filler





Highly polished nozzle surfaces reduce condensation to a minimum. Special drip cups on the nozzles catch any condensation, prevent moisture from entering cans.

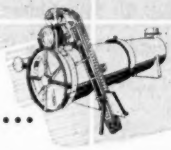
Designed specifically for frozen citrus concentrates, the new FMC 15 Pocket M&S Plunger Filler meets canners' demands for accurate sanitary filling in a high-speed continuous line. Special design features of the machine permit filling rates of 300 to 400 cans per minute with minimum centrifugal action. Heavy-duty stainless and alloy construction of all contact parts assures sanitation and long life. Non-corrosive materials, used for *all* parts above the can level, eliminate the possibility of corrosion from condensation. Thus product contamination and can discoloration problems are avoided. Simplified removal of nozzles reduces cleaning time. Fill volume is adjustable during operation by means of a single hand wheel, over a range of zero to 19.5 cubic inches, zero to 10.8 fluid ounces. Can sizes up to 211 x 400 can be handled if desired. Another important feature is the "no-can-no-fill" mechanism.

Write for full information on M&S Fillers and other FMC filling and canning equipment, or call your nearest FMC representative.

OTHER FMC EQUIPMENT FOR FROZEN CITRUS CONCENTRATES

FMC SCREW FINISHER

FMC NON-SHOCK CASER



FMC CONTINUOUS CAN FREEZER

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Food Industry News

West Coast Alliance Looked Upon As Broad New Food System

What West Coast observers see as the possible nucleus of a broad processor-to-consumer development was initiated last month when Golden State, Ltd., joined forces with Blair Holdings Corp. to form Western Industries, Inc.

As a first step, Western Industries acquired an 85 percent interest in Jim Dandy Markets, Inc., a chain of five supermarkets in the Los Angeles area.

On the surface, this first step would appear to be nothing more than a continuance of Golden State's recent efforts to multiply the outlets for its dairy products. But the eyes of the country's food leaders are directed to the mutual interests apparent in the separate holdings of the two participating companies. Golden State, in addition to its widespread dairy operations, recently acquired an interest in Sugar 'n Spice, Inc., a southern California baking company, and in two small chain outlets comprising two stores each. Blair owns Pepsi-Cola of Los Angeles, and holds important interests in Lucky Stores, an expanding 31-store chain of supermarkets in the San Francisco area.

See Further Expansion

Any merger of these mutual interests, it is thought, together with further possible ventures of Western Industries into the food processing field, could rapidly develop into a fully integrated food processing and marketing enterprise that would have no parallel on the West Coast.

The deal also brought Golden State 100,000 shares of Blair holdings for a reported $300,000. That kind of investment leaves no doubt that Golden State gets the inside track in Lucky Stores. And in the aggressive California dairy battle for supermarket outlets—confined up to now to the Los Angeles area— this aspect alone has caused some soul-searching throughout the state. If it means anything, the trade contends, it is that Golden State means business on a statewide scale.

This Los Angeles struggle has been mounting since the war. With the sharp rise in handling costs, the L. A. dairies determined that their chances for real profits lay in sales to supermarkets, not in home deliveries. The Arden Milk Co., for instance, owns the Mayfair supermarkets, Lucerne is owned by Safeway Stores, Jersey Maid and Golden Creme dairies are jointly owned by two separate groups of supermarkets. When a supermarket is taken over by a dairy, or vice versa, the other dairies sell some milk there, but the controlling dairy takes the cream from the profit bottle.

Research Seen Lagging On Dehydrated Foods

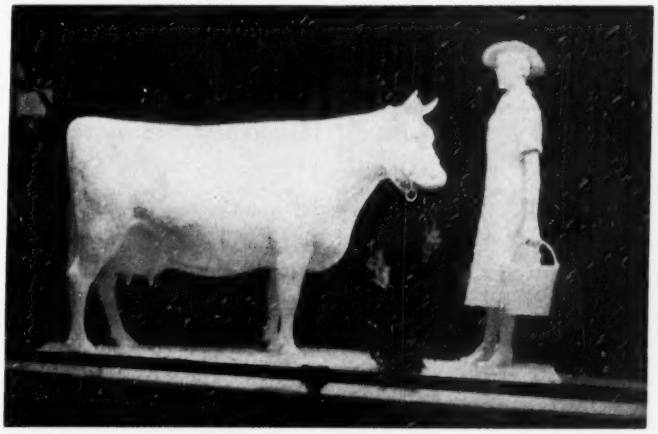
The recent conference on dehydrated foods, held at University of California, Berkeley, revealed how little has been done with dehydration since the end of World War II.

In the five postwar years, 90 percent of the nation's fruit and vegetable dehydration plants (most of them located in the West) ceased operations. Out of 375 plants operating in 1945, only 35 were in production in 1950. Of these, 18 were wholly dependent upon ERP requirements for potato flour. Most of the others then in production were processing items in commercial demand, such as onions and potatoes.

When the shooting stopped at the end of World War II, so did production and progress in the majority of dehydration plants. Little or no technological and engineering progress has been evidenced. Fortunately, the initial military dehydrated food requirements for Korea were comparatively light: 7,000,000 lb. of potatoes, 3,000,000 lb. of eggs, and 150,000 lb. of onions.

In December, 1949, a program was approved by the QMC in which dehydrated foods were to be again included in soldier's diets. Each Army menu is to include eight dehydrated food items and three soups during the year. Selection of these items is on a basis of consumer acceptance (the soldier being the consumer), with quality specifications requiring that these foods must be as good as their fresh counterparts when reconstituted and cooked. Since it is well known that no processed food is of identical quality to the fresh raw material, this surprising requirement could pose insurmountable problems.

Only nine items out of a list of 22 fruits and vegetables lending themselves to dehydration were termed acceptable. Other foods, such as spinach, are not regarded as acceptable since tests have shown that the soldier will refuse to eat this product even when it is fresh.



One Way to Use It

Butter surpluses would be no problem if this bit of art work, displayed at the Michigan State Fair, were practiced on a big scale. Figures were made on a frame and covered with 448 lb. of butter. Trouble is the job's to be remelted and sold to a wholesaler, which will, at least, ward off howls of waste. (Wide World)

Don't Let Spelling Fool You

Those ads you have been reading in some of the popular magazines urging heavier dunking result from a joint effort by the Bakers of America and the Doughnut Corporation of America. Here Walter Hopkins of B of A and David Levitt of DCA look over one of their concoctions. The question, is a donut always a doughnut, is left moot. But they go into detail about what to do with either.

New Order Seen Limiting Frozen Fruit Process

Regulation of the processes by which frozen fruits are produced may result if the tentative order issued by Food & Drug Administration in early October is formally adopted. It is expected that the frozen fruit manufacturers will file vigorous exceptions to parts of the order.

The ratio of fruit to liquid put-in was established by F&DA in the tentative standards of identity and fill. These include a syrup minimum limit of 15 percent of the contents of the package and a maximum limit, which varies (with different fruits and different sizes of fruit) in the range of 25 to 37 percent. This immediately raises the question of enforceability since there is no known relation between put-in and cut-out percentages, due to osmotic changes after filling.

The perennial sugar versus corn sweetener controversy has apparently been resolved again, as far as the tentative order goes, in favor of unrestricted corn sweetener use to the extent that the frozen fruit industry desires. Another issue, which was discussed at length during the hearing, was the label statement of blanching or use of optional ingredients to retard enzymatic activity. Early indication is that the tentative order will be satisfactory to the industry in these respects.

Unsettled, however, is the proposed standard for "mixed fruits." Also anticipated among the industry exceptions is the F&DA choice of the 11-lb. container size, above which percentages of all ingredients must be declared on the label.

November 18 was set as the date by which written comments must be filed with F&DA. Because of the large number and variety of questions still at issue, it is likely that an extension in this date will be requested. A spokesman for the frozen fruit packers emphasized, however, that the industry is not resisting standards: "What we want is a set of *workable* standards, with which we can live and still put out good products."

Spice Antioxidant Action Studied at Minnesota

Virtually all samples in a preliminary study of the antioxidant activity of common spices in a lard substrate showed positive results, while in a few cases, the antioxidant effects were very pronounced. This evaluation made as part of a continuing study at the Hormel Institute of the University of Minnesota, through a fund set up by the American Spice Trade Association, indicated that 25 spices had an antioxidant index between 1 and 2; eight had an index between 2 and 3; three had an index between 3 and 4, and two spices had an index above 4.

There was little difference between the antioxidant indices of various samples of the same spice, suggesting according to an interim report, that in general the antioxidant activities of spices are relatively independent of their origins.

Antioxidant properties of the spices are determined not only by their antioxidant content, but by their prooxidants. The stability studies are being repeated, therefore, using fractions of the whole spices obtained with the aid of various solvents. The more promising spices will then be selected for more intensive and detailed studies of their antioxidant nature.

Seventy-seven samples representing the following 32 spices were tested: Allspice, anise seed, basil leaves, bay leaves, caraway, cardamon, cassia, celery seed, chili, cinnamon, cloves, coriander, cumin seed, dill, fennel, fenugreek seed, ginger, mace, marjoram, mustard, nutmeg, oregano, paprika, pepper (black), pepper (red), pepper (white), poppy seed, rosemary, sage, savory, thyme, and tumeric.

Meat Institute Revives Technical Sessions

Revival of two days of technical sessions highlighted the 45th Annual Meeting of the American Meat Institute in Chicago, last month. Total registration of 3,722 set a new high for the gatherings.

Papers on self-service packaging of meats, on engineering and construction subjects, and on sausage drew seating capacity attendance. Those dealt with the production and operating problems of self-service packaging, the effect of light upon meat discoloration, the problems and experiences of retailers handling self-service packaged meats, insulating materials, selection and maintenance of evaporators for refrigeration, treatment of packinghouse wastes, plant maintenance, outlook for sausage and meat supplies, trends in packaging of sausage and ready-to-eat meat products, and developing of consumer demand for sausages. Other production subjects of large audience were new developments in bacon curing and lard rendering and processing.

Programs for the other sessions covered sales and advertising, with emphasis on sales training and sales personnel relations, livestock production and grading, hide curing, nutritive values of tankage and meat scraps, and accounting in respect to executive control, to supplying reports to Federal Government agencies, and to new and improved accounting procedures.

Throughout the five days of the meeting, there were consistent assurances of adequate meat supplies to meet both military and civilian needs. John F. Krey, chairman of the Institute board, reported in his opening

address to the general session that the 1950 meat production is expected to be about 22,400,000,000 lb. and that for 1951 it will be at least 23,500,000,000 lb., in comparison with less than 22,000,000,000 lb. in 1949. Military needs for the coming year are expected to be less than 1,000,000,000 lb., or only about 4 percent of the total expected 1951 supply. These estimates indicate a per-capita supply of 146 lb. for 1950 civilian consumption and 150 lb. per capita for 1951, as contrasted with 140 lb. in 1942, under meat rationing.

R. J. Eggert, associate marketing director of the Institute, stated that commercial sausage production is expected to exceed 2,300,000,000 lb. in 1950, 2 percent over that for 1949 and over one-third greater than sausage production in 1939. Production during 1951 is likely to continue to increase. Hog slaughter under Federal inspection for the 1950-51 season will be slightly over 58,000,000 head 2,000,000 more than for the 1949-50 crop year. Good pasture conditions and possibility of soft corn are delaying the marketing of cows, and beef supplies are expected to continue relatively short this fall and winter.

Robert Lavidge, department of marketing of the Institute, reported on a survey, made by the Institute's subcommittee on packaging, which shows preference for package sizes as follows:

Skinless frankfurters and wieners 1 lb. and ½ lb.; fresh pork sausage—bulk, 1 lb.; fresh pork sausage, small links, 1 lb. and ½ lb.; smoked pork links, 1 lb.; sliced cold cuts, 4, 6, 8 and 10 oz.; liver sausage midgets or chubs, 4, 6, 8, 10, 12, 14, and 16 oz., and dried beef, 4 oz.

Exhibits of 65 companies covered a new lard rendering process, quick curing of bacon, mechanical skinning of frankfurters and wieners, and packaging of meats for self-service marketing. In addition there was a general showing of meat packing equipment, supplies, and ingredient materials.

Correction

In the article "Vegetables and Fruits for our Fighters," beginning on page 44 of the October issue, two erroneous paragraphs appear outlining the methods for manufacturing dehydrated pea soup. Due to a misunderstanding, this insertion was treated as part of the author's manuscript, which it was not. The author, Joseph R. Wagner, provides us with the correct procedure:

"To prepare the dehydrated soup, dried Alaska peas are soaked to a moisture content in the range of 45 to 55 percent. These are then pressure cooked for 20 minutes at 240 deg. F., following which they are comminuted to a fluffy mass, spread in thin layers on drying trays, and dried to approximately 3 percent moisture content. The drying operation requires from one to one-half hours in a cabinet dryer. The dehydrated product is screened to render it more uniform, and break up agglomerates. Fat and seasonings are then blended in, in the proper proportions. The soup mix is then ready for use or packaging.

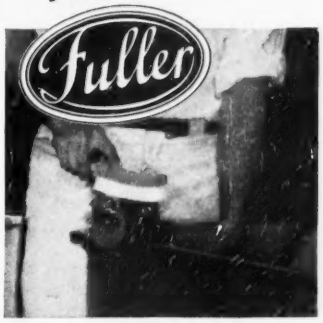
"The Number 2½ container holds 15 servings of 1¼ oz. Individual servings packaged separately are readily used by the serviceman in the field. The powder is emptied into a field drinking cup, and mixed with 8 oz. of water from the canteen. The issue mess-spoon is the only other utensil required. Depending upon heating facilities, the serviceman can prepare a hot, tepid or cool mixture. The only difference will be the length of time required for mixing. With hot water, the desired consistency can be reached in about 1 minute. Warm water takes two or three minutes. Unheated water can be used, but takes an appreciably longer mixing period (to a maximum of 20 minutes). Regardless of temperature, there is no lumping."

One Tomato Too Many

Tractor-trailers may have replaced camels, but you still have to be careful about overloading. This complicated method of making tomato juice was tried out on a highway near Baltimore and is not recommended by processors. (Wide World)

BEECH-NUT BRAND
FOODS OF FINEST FLAVOR

ON THE
BEECH-NUT
"SCRUB TEAM"
FOR 20 YEARS



The extreme care exercised at the Beech-Nut Packing Company in maintaining top standards of cleanliness is exemplified in the pictures here of their Baby Food Department. Yet daily scrubbing is hard on brushes. Beech-Nut has used Fuller brushes for 20 years and found that these brushes give excellent service. For further information, phone or write your nearest Fuller representative, or write . . .

THE FULLER BRUSH CO.
INDUSTRIAL DIV., 3640 MAIN ST., HARTFORD 2, CONN.
In Canada: Fuller Brush Co., Ltd., Hamilton, Ont.

4-Way Ads

Inserted on consecutive pages of *Life* and *Look*, these 4-in-1 ads represent a joint promotion by the American Meat Institute, American Dairy Assn., Quaker Oats and General Foods. Copies of the point-of-sale poster went to grocers throughout the country. The ads will run through November.

Cal-Pack Sells "Sunkist" To Growers Exchange

With California Fruit Growers Exchange recent decision to get on the citrus-concentrate bandwagon came the realization that their fresh fruit trademark, "Sunkist," was in the hands of California Packing Corp. as far as processed foods were concerned. The Exchange soon remedied its situation, however, when it agreed to pay Cal-Pack $1,250,000 over a period of five years for exclusive ownership of the trademark.

The agreement provides that Cal-Pack will discontinue the use of the trademark on its line of products after it completes the distribution of goods packed from the 1950 crop.

The Exchange had a sizeable stake in this name. The 42-year history of "Sunkist" advertising by the Exchange began with a very modest appropriation of $250 in 1905. In 1907 they employed an advertising agency and upped their budget to $25,000 and, during the intervening years, have expended a total of $55,000,000 to advertise fresh oranges, lemons and grapefruit. Total annual advertising budget in recent years has been about $3,000,000.

When the California Packing Corp., was organized in 1916 by four food companies, one of them, the J. K. Armsby Co., Chicago, used Sunkist as a trademark. Another firm provided the name Del Monte, which became the featured label of Cal-Pack and the Sunkist name was used only for regional distributors.

Cornstarch Hazard Study Reported by Bureau

Strict precautions to eliminate sources of ignition and to prevent dust cloud formations are needed to minimize explosion hazards when powdered starch—extensively used in the confectionery industry—is handled in large quantities.

This is the conclusion of Bureau of Mines researchers in a report recently published. The publication describes laboratory studies supplementing earlier Bureau experiments following a severe starch-dust explosion in a candy factory two years ago.

Results of these experiments will be embodied in a code to be prepared by the National Fire Protective Assn. aimed at preventing dust explosions in the confectionery industry.

Bureau of Mines researchers learned that a high moisture content lessens, but does not eliminate the starch explosion hazard. Coarser starch is less explosive than the fine variety. In practice, however, nearly all starch contains a fair proportion of fine particles. Bureau engineers suggest that explosion dangers can be reduced by treating powdered starch with edible oil and by adding calcium carbonate. To reduce structural damage, explosion relief vents should be provided in plants.

A free copy of the report, *Recent Studies on the Explosibility of Cornstarch* (Report of Investigations 4725), may be obtained by writing to Bureau of Mines, Publications Distribution Section, 4800 Forbes St., Pittsburgh 13.

Meat Industry Dedicates New Research Labs

Dedication of the new $750,000 research laboratories of the American Meat Institute Foundation, on the University of Chicago campus in October, marked the attainment of a goal set 26 years ago.

Housed in a three-story and basement building, these laboratories will be devoted to a cooperative program of research and education embracing all scientific and technological aspects of livestock production and processing and of utilization of products derived from livestock. They offer excellent opportunities for interchange of scientific information between the Foundation staff and scientists of the University and with scientists of other research organizations and institutes on the campus. Some Foundation staff members have professorial affiliation with the University and collaborate in the training of young scientists to the extent that some University graduate students do their thesis work in Foundation laboratories under supervision of Foundation scientists.

This cooperative research program had its begining in 1924, when voluntary contributions totaling $50,000 made possible the establishment of laboratory facilities by the Institute of American Meat Packers in one of the University of Chicago buildings. When once under way, the research program was maintained through contributions from all member companies of the Institute.

Increasing need for more adequate facilities and an expansion of the research program resulted in the organization and incorporation of the American Meat Institute Foundation in 1944 to make plans for and to provide ways and means of implementing the broadening and speeding-up of

the original long range research and educational program. Building operations started on a small scale in 1947.

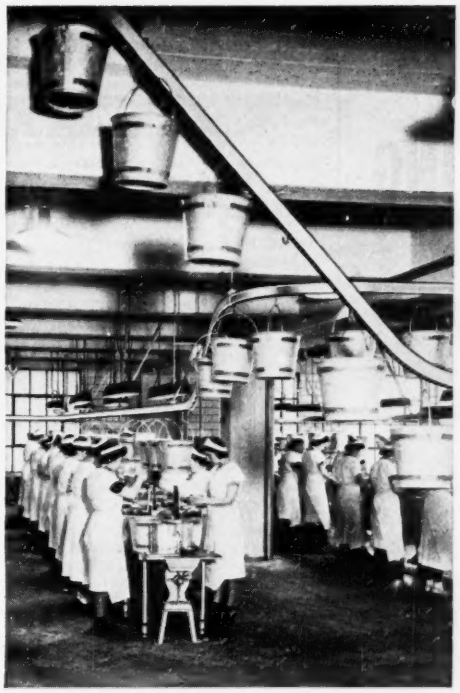
Individual laboratories are equipped and manned to do work in the fields of analytical and physical chemistry, biochemistry and nutrition, organic chemistry, bacteriology, fat and oil technology, histology, home economics, animal feeds, and hides and skins and to do laboratory service work for the meat packing industry on a fee basis.

Present laboratory staff consists of 40 technically trained people aided by technicians and University graduate students. As many as 22 projects are under way, ranging from meat quality studies to the function of vitamin B_{12} in metabolism and including studies on fat rancidity and antioxidants, food poisoning microorganisms, greenish discoloration of sausage and cured meats, dehydration of meat, amino acid and vitamin content of processed and canned meats and meat curing. The research program and staff will continue to broaden and expand as additional funds and facilities become available.

Contributors to the building of the laboratories are 298 meat packers in the United States, Hawaii, Mexico, and England, two cold-storage companies, and the National Renders Assn. Twenty-five manufacturers contributed supplies and equipment for the laboratories and refrigerated rooms.

Amend Meat Regulations

Nineteen amendments to the meat inspection regulations became effective Oct. 20, following the proposed amendments published on p. 4606 of the July 19 *Federal Register*. (see FOOD INDUSTRIES, September 1950 p. 136.) The order making these amendments effective appeared on p. 6285 of the Sept. 20 *Federal Register*.



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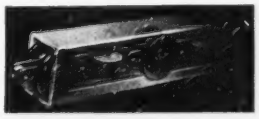

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PMA Assigned to Mobilize War Food Requirements

Food processors and others in the food industry will deal with USDA's Production & Marketing Administration in getting priorities and obtaining allocations of scarce materials or equipment. The PMA was assigned all of the mobilization functions given to USDA in the Defense Production Act of 1950.

A number of new units were set up:

Office of Requirements & Allocations will serve as the central coordinating point for the development and determination of over-all food supply availability and requirements, allocations, production adjustments, and related programs.

Office of Materials and Facilities will supervise the over-all determination of requirements for machinery, equipment, materials and services needed in connection with production, processing, transportation and handling of food and agricultural commodities. This office will then serve as a claimant before appropriate agencies in securing the necessary allocations and distribution of essential materials and supplies.

Food Distribution Branch will determine civilian food supply requirements and direct cooperative programs and operations related to the food supply and its distribution.

The PMA has also already set up a Price Staff which will be responsible for evaluating and recommending on questions of price. According to information furnished by the USDA this would include the use of price mechanisms to stimulate production, the effect of legal price minimum and other price provisions of the Defense Production Act, and the relationship of price allocation controls, distribution, purchasing, inventory management and related activities.

Pack of Canned Salmon Lowest Since 1921

This year's salmon pack is the smallest since 1921, when 3,600,000 cases were produced. The 1950 pack of U. S. and Alaskan salmon, estimated at less than 4,000,000 cases, is due to smaller runs of salmon. It contrasts sharply with an average of 7,642,000 cases for the years 1934-38. Total packs for 1949 and 1948 were 5,524,916 and 4,824,966 cases respectively.

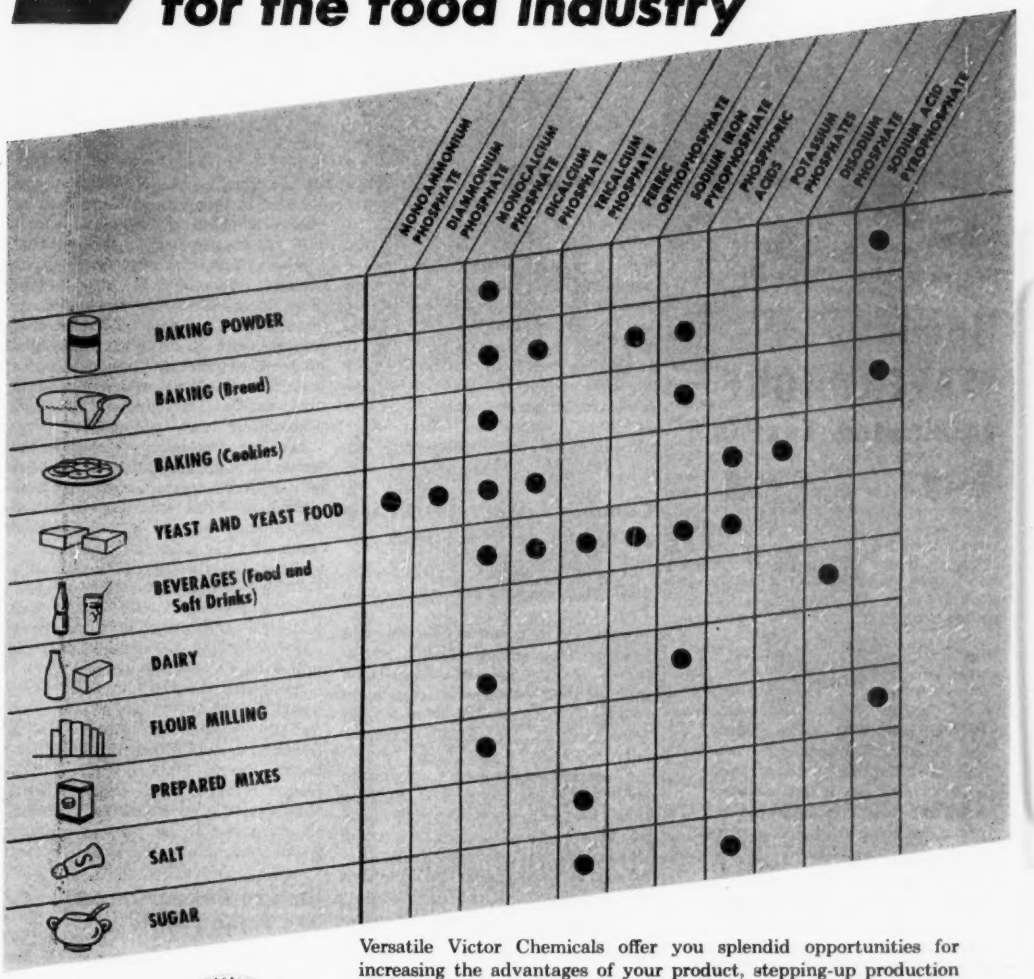
Interior Department's Fish & Wildlife Service reported that the Columbia River pack in mid-September was slightly below the 1949 production of 175,809 cases.

The pack of salmon in the Puget Sound area was 118,361 cases to Sept. 9. The pack on the same date last year was 463,295. The decline in Puget Sound was due to the normal reduced run of pink salmon in even-numbered years, and to a disappointing failure of the sockeye salmon run. The pack of Puget Sound sockeye by mid-September was less than half of the production in the previous cycle year, 1946.

Boon to Homemaker

Pillsbury tells us that making pie crust with Mazola oil, cold water and a certain flour "is a boon to home bakers like Dorothy Leifson . . . who always had trouble 'cutting in shortening.'" Must admit she looks rather pleased about it all.

VERSATILE VICTOR CHEMICALS for the food industry



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Bar Associations Ask Uniform Food Laws

There is need for uniformity in food and drug laws among the nations, and study should be made to remove the differences in the interest of world commerce and protection of consumers, declared Paul Martin, minister of National Health & Welfare of Canada, in an address to the joint annual meeting of the American and Canadian Bar associations in Washington, D. C. recently.

Martin suggested that the American and Canadian lawyers who are particularly interested in food and drug legislation and the government officials concerned with enforcement form a committee to study how uniformity could be achieved.

The Washington meeting was the first in which officials in charge of administering the food, drug, and cosmetic laws of the United States, the United Kingdom and Canada met to discuss their common problems. It is also the first time that members of the legal profession interested in these laws have gathered to study them and to make suggestions about their phrasing and administration.

Candy Industry Now Aiming At Coordinated Courses

A coordinated program of candy production courses was discussed in New York, in September, by representatives of candy associations and by supplier associations and educational institutions at which such courses have been held. Action to coordinate future courses was recommended at the NCA Board of Directors meeting last June.

"The interest in candy production methods has been increasing since the first production conference sponsored by the Pennsylvania Manufacturing Confectioners' Assn. at Lehigh University, in 1947," said NCA President Philip P. Gott in opening the meeting.

"Last year, in addition to the annual Lehigh Conference, production courses were held in New England and the Central West plus numerous production talks given at meetings of the American Association of Candy Technologists throughout the country. It is now felt by all the groups sponsoring such courses and by the participating production experts who lecture at the course, that a coordinated program is a necessity for continued progress in the field of technical production training."

It was recommended by the production conferees that the NCA appoint a committee to investigate the possibility of centralized national control over the local regional conferences and to work out a program of speakers and subjects which could be repeated at the regional meetings. Another activity of the committee would be to investigate the problem of technological training of manpower at various levels.

World Cocoa Congress Wants Duties Eased

The third International Congress of Chocolate & Cocoa Manufacturers, in which 250 delegates from 27 countries participated, ended late in September. Greater part of the work of the Congress' 11 commissions was devoted to technical problems such as the re-definition of cocoa and chocolate and standardization of analytical methods. Among recommendations put forward was one for the largest possible collection and circulation of statistics on production, sales and exports, with all manufacturers urged to form national associations for the purpose of international co-operation through the International Cocoa & Chocolate Bureau in Brussels.

Another resolution recorded the delegates' opposition "to all supplies at abnormal prices resulting from subsidies, direct or indirect, aimed at favoring exports in an abnormal manner".

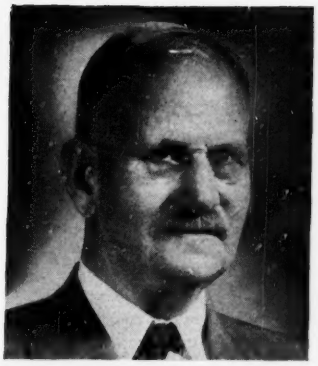
Delegates also urged Governments levying heavy duties or taxes on chocolate and cocoa powder to lift such taxes as a contribution to lowering the cost of living and increasing the purchasing power of wages.

Delegates from the following countries participated: Argentina, Australia, Austria, Belgium, Brazil, Britain, Canada, Czechoslovakia, Denmark, Egypt, Finland, France, Germany, Holland, Israel, Italy, Liberia, New Zealand, Norway, Peru, Portugal, South Africa, Spain, Sweden, Switzerland, Turkey, and the United States.

Bakers Protest Report On Bread Profits

Presentation of baker and retailer profits on bread, made in the Bureau of Agricultural Economics' September bulletin, has been termed distorted in a protest from Charles T. McCarthy, president, American Bakers' Assn.

The publication indicated that in 1947 the retailer and baker got 61 percent of the consumers' dollar and by 1949 the ratio had changed to 71 percent. Mr. McCarthy, in a letter to Secretary Brannan, points to glaring omissions of other cost factors, leaving the impression that the shift of 10 percent represents clear profit.



Award Chairman

Dr. S. C. Prescott, dean emeritus of the food technology department, M. I. T., and "father" of IFT, has been appointed chairman of the Food Industries Award Committee by IFT President Paul F. Sharp. Soon after the entries close on Jan. 1, 1951, the committee, under the direction of Dr. Prescott, will set to work to select the outstanding achievement in food technology now in commercial use and developed since Jan. 1, 1946. The Award is for an improved or novel process, not for a food product, and it will be awarded to a company, not an individual. Presentation will be made in at the 1951 conference of IFT.

As an example of cost factors omitted, McCarthy notes that labor costs in 1947 represented 38 percent of the baker-retailer share of 61 percent. In 1949 this labor cost was 49 percent. He further pointed to the baking industry's profits over recent years, which he said have consistently averaged less than 4 percent.

Celery Pickling Tests Conducted in Florida

The Vegetable Products Laboratory of the Florida Agricultural Experiment Station, Gainesville, recently revealed several interesting experiments with celery as a processed food. The work has been carried on by R. A. Dennison and H. M. Reed, vegetable crop processing specialists.

Celery juice is one of the items that has been worked on, but Dennison and Reed believe that the best success thus far has been with celery pickles, using pascal type celery. Of the celery grown in Florida about 60 percent is pascal type and 40 percent other types.

After washing and precooling, the celery was separated into individual stalks, and the leafy part and the

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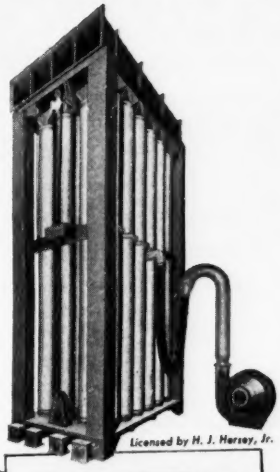

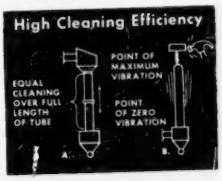

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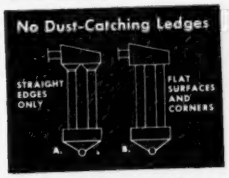
B. In filters requiring violent rapping, cleaning effectiveness varies widely from point of vibration to point where cloth is fastened to filter.



A. DAY Filters have no flat surfaces or ledges where dust can collect and become contaminated.

B. Most other dust filters have flat surfaces and ledges which collect dust and encourage infestation.

New highs in plant cleanliness are being achieved by food processing plants using **DAY** Type A. C. Dust Filters because all parts have been specially designed for better sanitation.

From inlet to outlet, **DAY** Filters have no flat surfaces or ledges for dust to accumulate and become contaminated. This feature is especially important in food processing where maximum cleanliness and elimination of bacteria are essential.

The **DAY** Filter is engineered to give higher cleaning efficiency and continuous-automatic operation with constant air volumes. The gentle, yet positive continuous cleaning action of reverse air jet rings permits the use of a high grade felt filtering fabric which collects even the finest dust particles. This high grade filtering material also allows greater air-to-cloth ratios. (Actual installations are operating successfully with air-to-cloth ratios of 15 or 20 to 1.)

The reverse air jet mechanism provides uniform cleaning over the entire length of the tubes, and operates with a maximum cloth area loss of only 1¼%. Air volumes remain constant and there are no cleaning shutdowns to cause high back pressures and sharp air volume variations.

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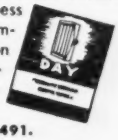

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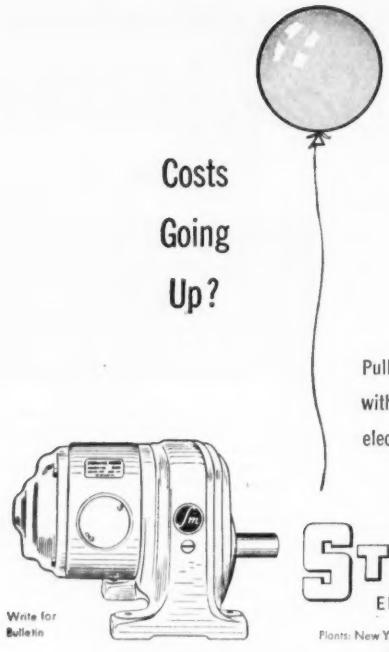

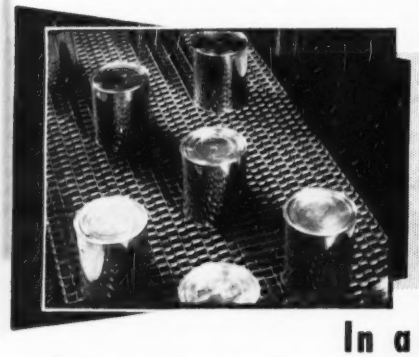

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QM Director

Donald K. Tressler has been appointed technical director of the Quartermaster Food & Container Institute, Chicago, succeeding George Gelman, resigned. Dr. Tressler was formerly head of the group of associates bearing his name. Appointment to his new post was effective as of Oct. 16.

basal end trimmed from each stalk. The main portion of the stalk was used for pickling, each stalk being washed again thoroughly and then cut into pieces about an inch in length.

The experiments conducted at Gainesville indicated that celery pickles can be made from either fresh or brined celery, but the results from brined celery were not scored as high as those from the fresh. In the preparation of pickles from fresh celery both steam and boiling water blanching were studied. Results indicated that approximately a 4-min. steam blanch and a 2½-min. water blanch were the best. The celery was cooled in cold water immediately after being removed from the blanch.

Packed In Syrup

After the blanching process, celery pieces were packed in glass jars and covered with hot pickling syrup. The syrup that gave the best results was made up as follows: Sugar, 5½ lb.; vinegar (5 percent acidity) 1 gal.; salt, 8 oz.; pickling spice, 3 oz. In preparing the syrup the spices were first removed from the vinegar. The pickling spices were tied in cheesecloth bags and heated just below the boiling point for 20 min. Sugar and salt were added when the bags containing the spice were removed.

The experiments indicated that for best results the pickles should be left in the pickling solution for about 3 weeks.

Celery pickles prepared in this manner have been found to be quite delectable by those who have sampled

them at the laboratory, and many visitors have shown keen interest in the product.

Turkey in Every Pot

USDA reports that as of late August, there was an all-time record crop of 44,550,000 turkeys fattening on the ranges. This is 6 percent more than last year and 1 percent above the previous high of 1945.

Responsible for the increases, say poultry analysts, are extra expansion on the part of large producers who offset the cut-backs of "fly-by-nighters," an abundance of cheaper poults, slightly lower feed prices during the hatching season, and a sustained firmness in the market for turkey meat. Increasing popularity of the Beltsville White, a smaller family-sized bird developed by USDA, is also a factor.

Total production of turkey meat is expected to be at a record level, with a separate trend toward large, broad-breasted birds for half- and boned-turkeys, roasts and steaks more than compensating for the trend toward the smaller-bodied birds.

Bakers' Scholarships

Southern Bakers Assn. of Atlanta, Ga., has established a scholarship fund of $50,000 for the baking technology program at the Florida State University. Immediately available is $7,500 for the first year's program. The balance of the fund is to be used over the next three years.

The money is to be used to provide education scholarships for the training of managerial personnel in the baking and allied trades industries.

Black Pepper Stockpile

Despite the fact that black pepper is no longer regarded as essential because substitutes have been found, the Munitions Board will not release any of it. There has been talk of releasing the pepper, estimated at several hundred thousand pounds, in an effort to lower prices.

Opinion is that the mere announcement that the government would put black pepper on the open market would send prices down some.

Munitions Board contends the stockpile was not set up to be used as a price-setting mechanism, and besides, the stockpile is too small to be felt even if it was all put up for sale.

The government began to stockpile pepper on the ground that it was an essential item for preserving and

PRINTWEIGH STOPS ERRORS

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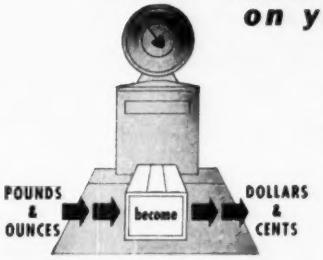

Errors made at the scale stay wrong forever. There is no chance to recheck; either the food product has been shipped or has lost its identity in the general stock. You've got to be *right*—weigh it right—Toledo Printweigh means *accurate* weights *accurately* recorded! Send for bulletin 2021 on modern weight control. Toledo Scale Company, Toledo 1, Ohio.

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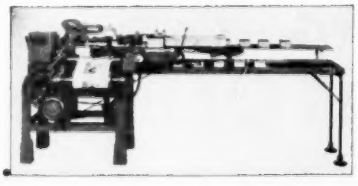

One Ton of Soup

Here's a Rhode Island fisherman who went swordfishing and came back with this choice bit of soup ingredient. The big turtle weighed close to a ton, which makes it a rare specimen that far north. (Wide World)

flavoring food for the armed forces. Because of this stockpiling and the fact that the prewar supply areas in the Dutch East Indies never got back into full production, prices have risen abruptly in postwar years.

F&DA Standards

Status of the food standards program of Food & Drug Administration in early October is reviewed below.

Future Hearings

1. *Ice cream,* new, standard of identity Resumption of prewar hearing scheduled for Nov. 13,1950; announcement on p. 5112 of Aug. 8 *Federal Register.*

2. *Preserves,* amendment. Hearing, requested by industry, to follow ice cream hearing; announcement soon.

3. *Margarine,* amendment. Hearing rumored to be requested by industry; would raise vitamin A minimum content and would specify method of vitamin analysis.

Hearings in Progress

None.

Tentative Orders Awaited

1. *Canned mushrooms,* amendment, standards of identity and fill. Expected soon; hearing adjourned in June 1950, briefs filed in July.

2. *Residue tolerances,* on fresh fruits and vegetables; new. Not ex-

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"Bumpy" records on your process temperature charts are a danger-signal! On juice heaters and other equipment, they mean not only fuel waste, but also sub-standard products that can cost you plenty in spoilage, replacements, and lost orders.

Costly "bumps" in your process records can be smoothed out automatically by installing Foxboro M-40 Stabilog Controllers. In every detail, these modern instruments are engineered to give the smoothest, most dependable control. For example, their exclusive self-aligning linkages are free from friction lag and backlash. Their advanced design makes settings positive and drift-proof. And their rigid unit construction insures permanent alignment.

Write for detailed Bulletin 381 describing cost-saving M-40 Stabilog Controllers for temperature, pressure, humidity and other process variables. **The Foxboro Company, 196 Neponset Ave., Foxboro, Mass., U.S.A.**

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Improved pen-arm movement — sturdier, simpler, smoother-operating.

Precision-made control mechanism — 0-200% proportional band — 500:1 variable adjustment in reset time provides wide range flexibility.

Compact, die-cast aluminum case — unexcelled protection of mechanisms . . . most compact case.

FOXBORO
REG. U. S. PAT. OFF.

INSTRUMENTS THAT IMPROVE Product Uniformity

UNITED STATES COLD STORAGE

Guardians OF THE NATION'S FOODS

CHICAGO
2055 West Pershing Road (Zone 9)

DALLAS
1114 Wood Street (Zone 2)

DETROIT
(United States Warehouse Co.)
1448 Wabash Avenue (Zone 16)

KANSAS CITY
500 East Third Street (Zone 6)

PORT LAVACA
TEXAS. P. O. Box 176

UNITED STATES COLD STORAGE CORP.

5 MODERN FORTRESSES FOR GUARDING THE NATION'S FOODS

SLOGS stops SLIPS!

WEAR SLOGS OVER BOOTS OR SHOES

USED IN BIG FOOD PLANTS

At last, a "sandal" made of non-abrasive, long wearing special COTTON DUCK.

In actual use, proved INVALUABLE where wet slippery floors or other surfaces make walking unsafe. Easy to put on; comfortable; adjustable to all sizes. Give double wear, because reversible. Improved personnel efficiency. The daily cost of SLOGS is so small, their safety so great, you can't afford to be without them!

NON SKID ON SLIPPERY WET FLOORS

Save Wear on Boots

$4.55 per pair
1 to 5 DOZEN PAIR
$3.95 per pair
DISCOUNTS ON LARGER QUANTITIES

BELLEROSE PRODUCTS CO.
24 Kerwin Place Tarrytown, New York

pected soon; hearing adjourned Sept. 15, briefs due by Nov. 15, 1950

Final Orders Awaited

1. *Canned corn,* new, standards of identity, quality, and fill. Expected soon, tentative order published in April 1950, exceptions filed in May.

2. *Cream cheese with (and) other foods; Neufchatel cheese spread with (and) other foods,* new, standards of identity. Not expected soon; exceptions to tentative order could be filed until Oct. 23.

3. *Bread,* new, standard of identity. Not expected soon; deadline for filing exceptions to tentative order extended again from Oct. 9 to Nov. 8 by order published on p. 6766 of Oct. 6 *Federal Register.*

4. *Frozen Fruits,* new, standards of identity and fill. Not expected soon: tentative order just issued, p. 6674, Oct. 4 *Federal Register;* exceptions may be filed until Nov. 18.

Standards Completed

None since last time reported. (Food Industries, October 1950, p. 147.)

USDA Grade Standards

Recent actions by Production & Marketing Administration of U. S. Department of Agriculture on U. S. Grade Standards and related activities include the following:

Edible sugar cane molasses, new, proposed, p. 6474, Sept. 26 *Federal Register* (corrections p. 6598, Sept. 30 *Federal Register*).

Sugar cane syrup, new, proposed, p. 6476, Sept. 26 *Federal Register.*

Pitted and unpitted sulphured cherries, revised, proposed, p. 6763, Oct. 6 *Federal Register,* written comments received until Jan. 4, 1951.

Italian sprouting broccoli (consumer standards), new, p. 6531, Sept. 28 *Federal Register,* effective Oct. 28.

Bunched beets, second revision, p. 6693, Oct. 5 *Federal Register,* effective Nov. 4.

Schedule of Events

November

8–9—American Butter Institute, 42nd annual meeting; Drake Hotel, Chicago.
13–15—Grocery Manufacturers of America, annual convention; Waldorf-Astoria, New York City.
15–17—Texas Technological College, 2nd annual dairy manufacturers short course; Lubback, Tex.

January, 1951

8–10—Michigan State College, annual processors' fieldmen's conference; School of Agriculture, East Lansing, Mich.

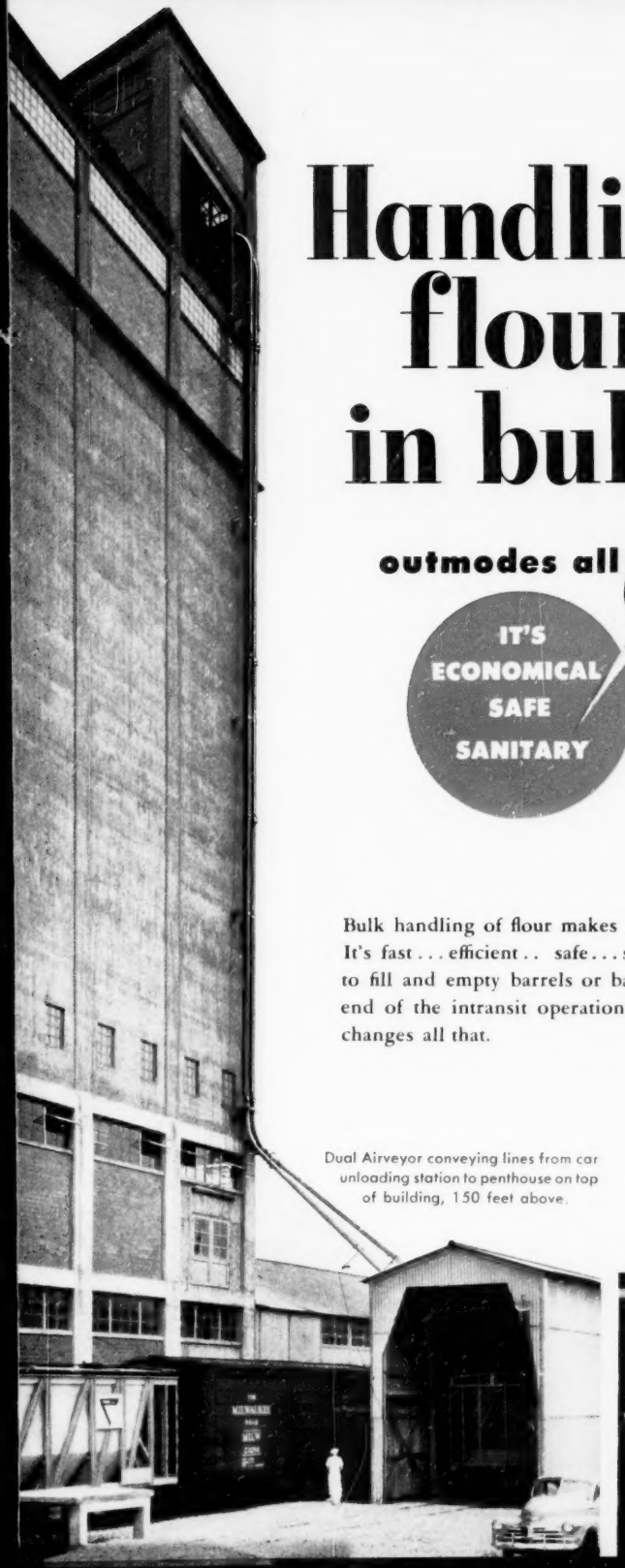
—*End*

Handling flour in bulk

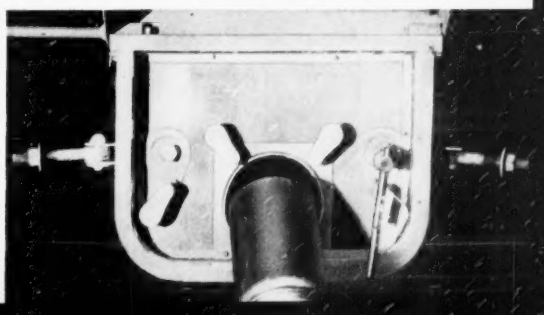
outmodes all other methods

IT'S ECONOMICAL SAFE SANITARY

Bulk handling of flour makes all other methods completely out of date. It's fast . . . efficient . . safe . . . sanitary. Today, it's no longer necessary to fill and empty barrels or bags . . . not necessary to stevedore at either end of the intransit operation from mill to baker. The Fuller Airveyor changes all that.



Dual Airveyor conveying lines from car unloading station to penthouse on top of building, 150 feet above.



Hopper bottom connection for the Airveyor lines on the Trans-Flo car.

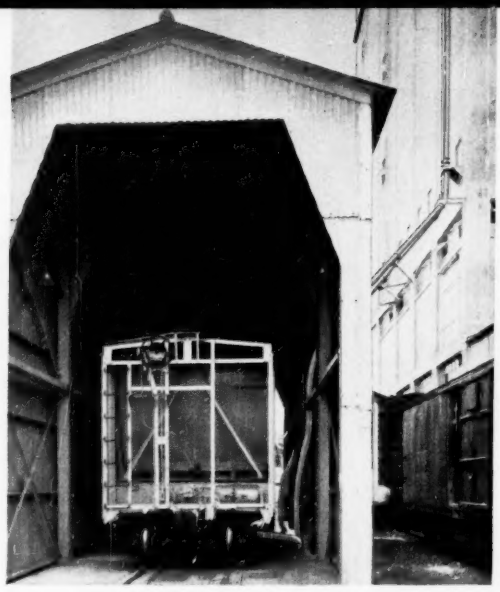
FLOWING FOODSTUFF

Originally developed by Fuller for handling bulk cement—the first large scale application for handling dry, pulverized materials—the economy, efficiency, cleanliness, speed and safety of pneumatic conveying systems—has led to their adoption by every industry where such materials must be moved from one location to another. Today, the Airveyor and the F-H Airslide Conveyor, as well as the original Fuller-Kinyon System, are effecting major economies in conveying pulverized and granular materials from ship or car to storage or processing operations in progressive plants the country over.

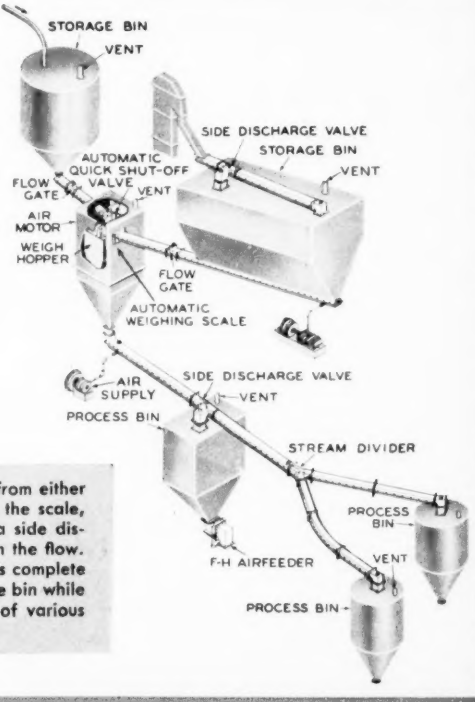
NOW . . . working with the General American Transportation Company in designing a hopper bottom system for unloading stainless steel, completely sealed cars—the two companies have perfected a system for bulk handling of flour that meets all the sanitary requirements of Federal, State and Municipal agencies—a system that not only reduces unloading and conveying time but also keeps infestation at the minimum.

RESULT . . . handling at the mill, in transit and in process, is far cleaner, far more sanitary than with any other method. There is no dusting with consequent greater safety. Economy is increased through the elimination of bags and barrels and the transportation of this tare; fewer man-hours are required for handling. Turn-around time is faster for the cars and waste is held to the minimum.

The conveying system is simplicity itself. Other than the blower and feeder, there are few moving parts; maintenance is reduced, reliability increased. The simple duct or pipe system, with inspection and clean out ports, eliminates sharp turns and pockets where flour might accumulate and infestation occur. The system can be blown completely free of all lading. 100 per cent retention of all visible dust is guaranteed. The only power required is a source of low pressure air.

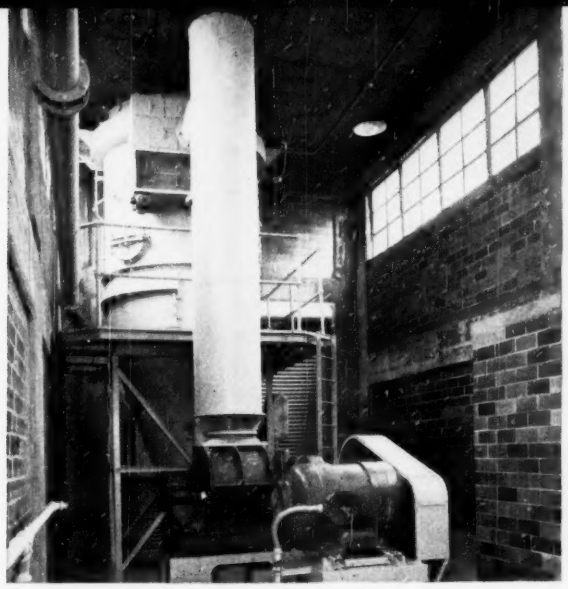


Trans-Flo bulk car spotted in unloading station. Note dual Airveyor unloading lines passing through the shed wall and continuing up the side of the building. Each line has a capacity of 20 tons an hour and both can be connected to one car to obtain a total unloading rate of 40 tons an hour.

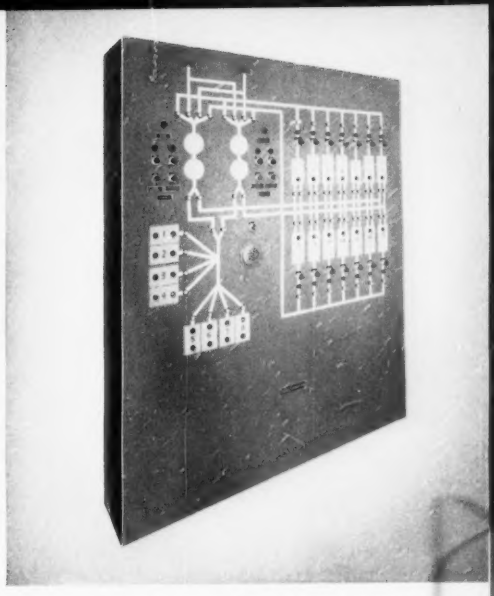


In this typical F-H Airslide Conveyor system, aerated flour flows from either bin to an Airslide which conveys it to an automatic scale. From the scale, another Airslide conveys to any of three process bins through a side discharge valve or a stream divider which may be set to proportion the flow. Aeration of the flour eliminates arching inside the bin and insures complete discharge. Duplicate process bins makes possible discharge of one bin while the other is being filled; multiple storage bins permit the use of various materials for a mix.

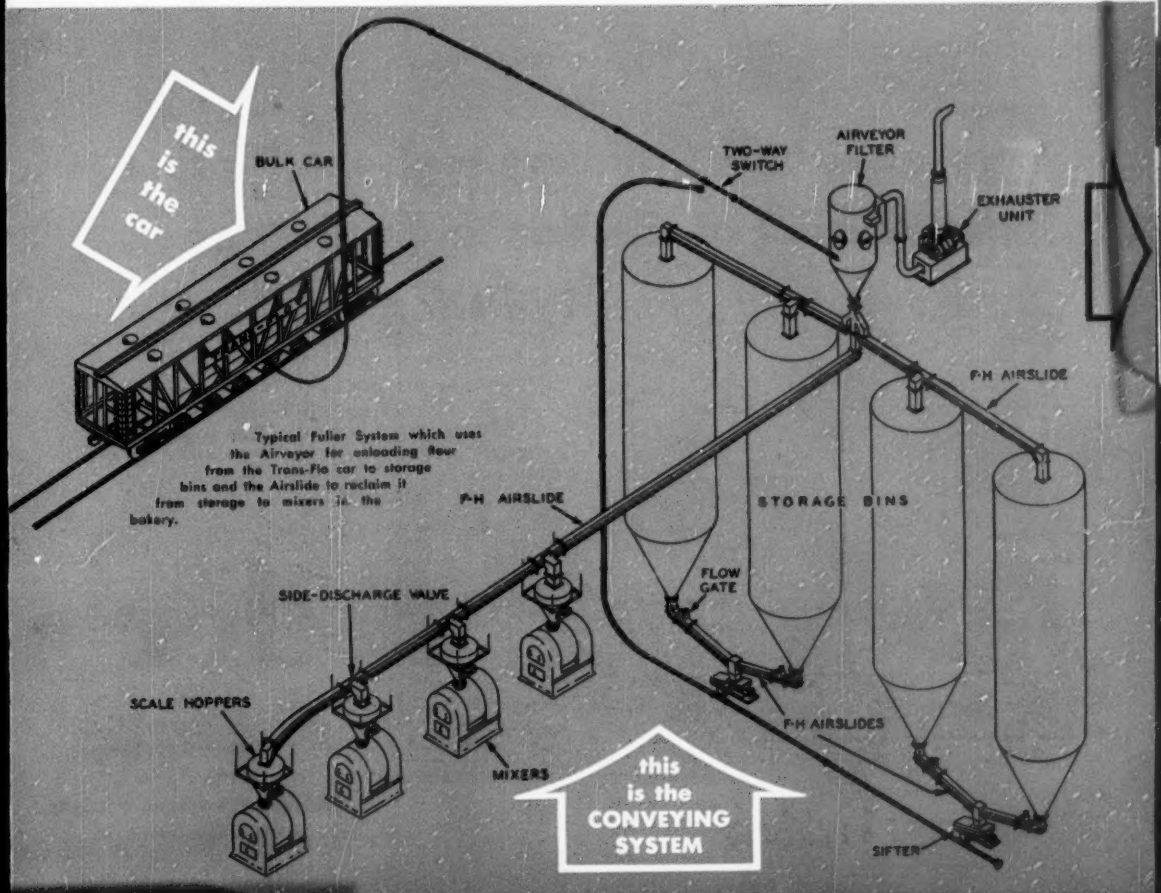
fuller



Airveyor filter type receiver, with exhauster and motor assembly in the foreground. This is the power supply of the Airveyor system, which furnishes a continuous flow which draws the flour from the car into the self-cleaning filter, where it is taken out of the air stream with 100 per cent retention of visible dust. The filter discharges the flour into storage bins by means of a rotary air lock.



Typical panel installation. The various sections of the system can, within the limits of the interlocking restrictions, be activated in any desired sequence. One man can operate and control the entire system.



Typical Fuller System which uses the Airveyor for unloading flour from the Trans-Flo car to storage bins and the Airslide to reclaim it from storage to mixers in the bakery.

Memo to Food Processors

Wherever dry, pulverized materials are handled today, there's a steady and growing preference for pneumatic conveyance. It reduces fire and explosion hazards to the minimum. It's faster, cuts down manhours as no other method can do and it's sanitary.

Progressive food processors are already effecting major economies with bulk shipments of flour and similar foodstuffs and pneumatic unloading and conveying from storage to mixers. Their lead is a mighty good one to follow. It's the modern, efficient, *profitable* way to handle not only flour but also dry pulverized or granular processed food ingredients to cut operating costs and improve the quality of your product. Use the coupon to have your handling system analyzed.

Pneumatic bulk handling took the Process Industries out of the bag and barrel age... Now it can flow foodstuffs for you.

FULLER COMPANY, Catasauqua, Pa.
120 S. La Salle St., Chicago 3
420 Chancery Building, San Francisco 4

FULLER COMPANY
Catasauqua, Pa.

Yes ..... I want you to make a survey of my present systems of conveying, loading and unloading. I realize this puts me under no obligation.

Name .....

Company .....

Address ..... City ..... State .....

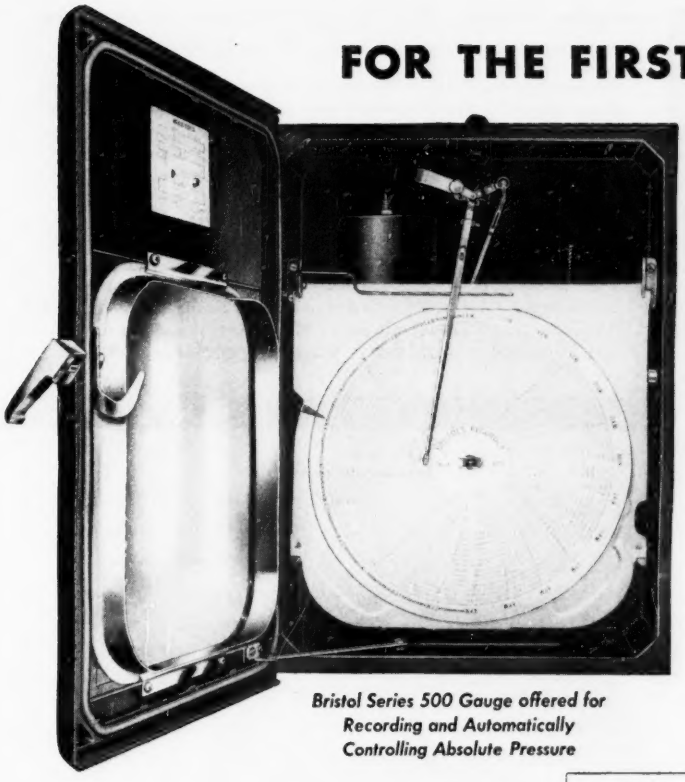
fuller

DRY MATERIAL CONVEYING SYSTEMS
AND COOLERS—COMPRESSORS
AND VACUUM PUMPS—FEEDERS,
AND ASSOCIATED EQUIPMENT

7259-A-FH4-2

Printed in U.S

FOR THE FIRST TIME



Bristol Series 500 Gauge offered for Recording and Automatically Controlling Absolute Pressure

Accurate Mechanical Recording and Controlling of Absolute Pressure

IN RANGES AS LOW AS 0 TO 6 MM!

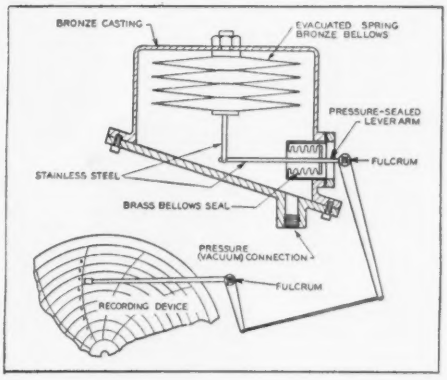
Again, Bristol scores a first!

Our new Low-Range Absolute Pressure Recording Gauge gives a direct reading of pressure above zero absolute, inherently corrected for barometric variations, with far greater accuracy than ever before possible—measuring ranges as low as 0 to 6 mm mercury absolute.

SINGLE BELLOWS—NO COMPENSATION NEEDED

Instead of *two* pressure elements—one for measured pressure, one to compensate for barometric pressure—Bristol uses a single calibrated bellows element, evacuated to practically a perfect vacuum, enclosed in a cast bronze pressure-tight housing. The bellows motion is transmitted outside the housing through an entirely new device—a pressure-sealed lever arm that is frictionless, entirely free from lost motion and turning moments due to changes in differential pressure across it.

Thus—with one measuring element, Bristol's Absolute Pressure Gauge operates in ranges hitherto considered impractical with metallic elements.



WHAT'S YOUR APPLICATION?

This entirely new, highly-accurate, direct-reading mechanical pressure instrument gives valuable information for controlling pressure wherever the operation of equipment depends upon a high and constant vaccum.

Bristol Low-Range Absolute Pressure Gauge is offered for recording, pneumatic or electric controlling, and pneumatic or electric remote transmission. For Bulletin G620, write THE BRISTOL COMPANY, 115 Bristol Road, Waterbury 91, Conn. (The Bristol Co. of Canada, Ltd., Toronto, Ont.; Bristol's Instruments Co., Ltd., Lynch Lane, Weymouth, Dorset, England.)

BRISTOL

Engineers Process Control for Better Products and Profits

AUTOMATIC CONTROLLING, RECORDING AND TELEMETERING INSTRUMENTS

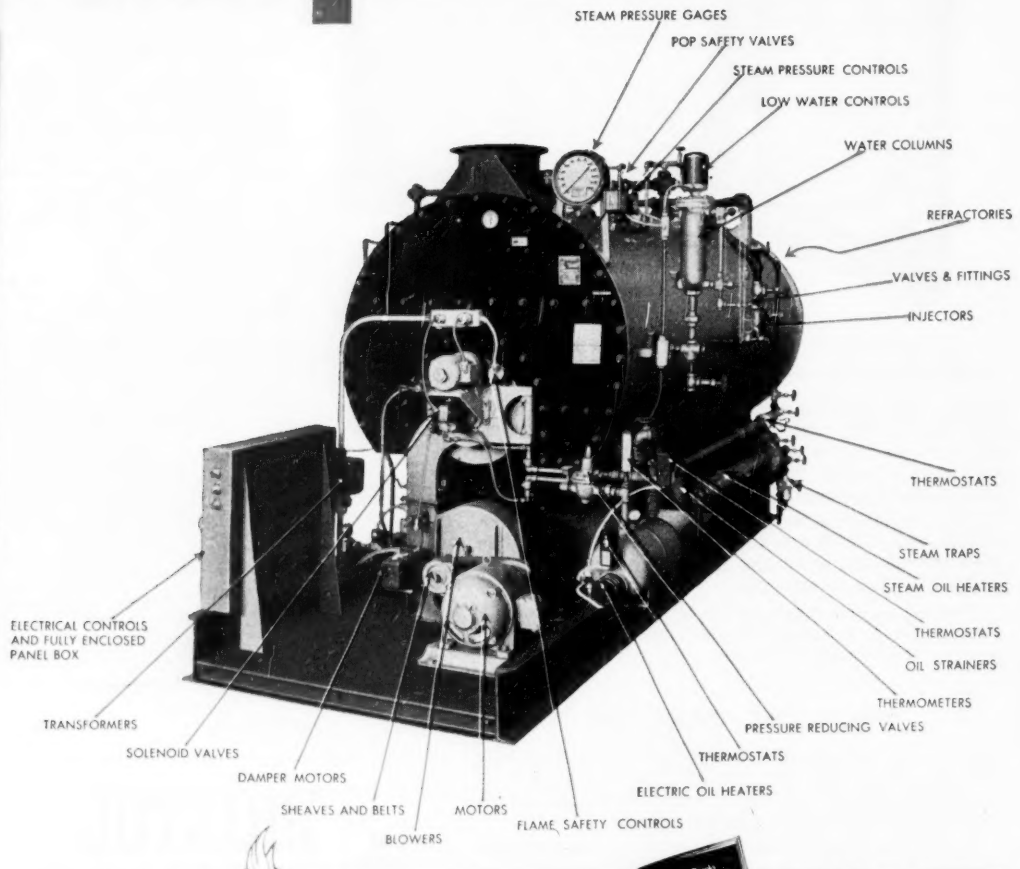
Matched quality components

another reason why you get a greater return from your investment in a Cleaver-Brooks Steam Boiler

Cleaver-Brooks steam boiler quality is the sum of many qualities. From the rolling-in of the first tube and through every step to completion, the highest standard of engineering, material and workmanship prevail. Every component is the tested product of a manufacturer of known standing — carefully selected by Cleaver-Brooks engineers through test and research.

Your Cleaver-Brooks boiler is the end-product of many specialized engineering talents and manufacturing skills. When you install Cleaver-Brooks you have a steam boiler of foremost quality — with immediate and long-range cost-saving advantages. Cleaver-Brooks self-contained Boilers — 15 to 500 HP 15 to 250 lb. p.s.i.— for oil, gas, combination oil and gas firing.

CLEAVER-BROOKS CO., 327 E. Keefe Ave., Milwaukee 12, Wis.



Cleaver-Brooks

STEAM BOILERS

NEW — The Cleaver-Brooks Steam Boiler Catalog — interesting — informative — beautifully illustrated. Write—on your business letterhead for your copy — no obligation.

Changes in Food Supplies

Materials

BEETS for canning were indicated at 162,570 tons in the September 1 estimates of BAE. This would compare with the actual 1949 harvest of 147,640 tons.

TOMATOES for processing were estimated at 2,634,500 tons on September 1, which would be about 4 percent under the 1949 production of 2,530,900 tons.

SWEET CORN grown for processing was indicated at 948,100 tons. This would compare with last year's harvest of 1,404,800 tons.

SNAP BEANS should reach 252,000 tons, according to September 1 estimates, which would be 6 percent above the 1949 harvest.

GREEN LIMA BEANS for canning and freezing should reach 73,960 tons, compared with 87,170 tons harvested in 1949.

CHICKS produced by commercial hatcheries in August reached the record total of 73,098,000—40 percent larger than August, 1949, and 78 percent greater than the five-year average.

Storage

FROZEN FISH and SHELLFISH held in storage September 1 totaled 154,100,677 lb., compared with 146,343,680 lb. held on the same 1949 date.

PUBLIC FREEZER occupancy rose 2 points during August, to stand at 73 percent on August 31. This compares with 66 percent on the same 1949 date, and an average occupancy of 77 percent.

COOLER occupancy also rose 2 points during August, standing at 62 percent at month's end. This was 9 points above the date last year, but 7 points under the average.

Production

ICE CREAM output continued to decline in August, the estimated 62,340,000-gal. total being 7 percent below August, 1949, and 4 percent less than the five-year average for the month. There was a contraseasonal July-August gain, however, of 2 percent. This is in contrast to a seasonal dip of 2 percent a year ago and a 1944-48 average decline of 9 percent between the two months.

AMERICAN CHEESE production in August, estimated at 83,800,000 lb., was 15 percent under July and 4 percent below August, 1949. A year ago the July-August decline was only 10 percent, but the five-year average is 13 percent.

CREAMERY BUTTER produced during August reached an estimated total of 125,180,000 lb. This was 3 percent under the August, 1949, output, but was 2 per cent larger than five-year average for the month. The July-August decline was 16 percent, compared with only 6 percent a year ago and an average decrease of 14 percent between these months in the five-year average.

MARGARINE production reached 84,129,000 lb. in August, of which 52,421,000 lb. were colored. This contrasts with the August, 1949, total of 79,106,000 lb., of which only 15,861,000 lb. were colored. Production for the year through August is estimated at 613,947,496 lb. compared with 561,748,893 in the same period last year.

POULTRY canned or used in canning during August totaled 15,233,000 lb., compared with 11,606,000 lb. so used during August, 1949, and a five-year average of 8,601,000 lb. for the month.

LIQUID EGG production totaled 32,261,000 lb. in August, compared with 21,814,000 lb. turned out in August, 1949, and a five-year August average of 50,977,000 lb. Of the August total, 13,416,000 lb. were frozen, compared with 7,666,000 lb. in August last year. Dried egg output came to 5,095,000 lb., compared with 3,951,000 lb. in August, 1949.

Indexes

Business Week's index of business activity hung at 222.3 for the week ending Oct. 14, down a fraction from the previous week's 222.6. A month ago it stood at 221.3, and a year ago, 161.1.

THE COMMODITY INDEX on foods, compiled by the New York Journal of Commerce, rose to 188.4 for the week ending Oct. 20, compared with 180.9 the previous week. September averaged 190.7, and October, 1949, hit 177.5.

easier *smokehouse* **cleaning**

Now . . . a stubborn dirt job can be finished better and faster with Metso Cleaners. Metso's properly balanced alkali and silica penetrate grease and dirt deposits in less time.

Compare the results in your plant.

Philadelphia Quartz Company
1148 Public Ledger Bldg., Phila. 6, Pa.

METSO

metso *cleaners*

Low Cost Fortifiers Help Meet Tougher Competition!

ONE added low cost nutritional fortifier can spark advertising and sales . . . provide fresh appeals to consumers . . . put you far ahead of your competitors!

One of our technical men will be pleased to consult with you. No obligation! Special Products Division, STANDARD BRANDS INCORPORATED, New York 22, N. Y.

VITAMIN D PRODUCTS: Hy-Dee Irradiated Dry Yeast, Irradiated Dry Yeast Type 700-H, Viosterol (Irradiated Ergosterol).

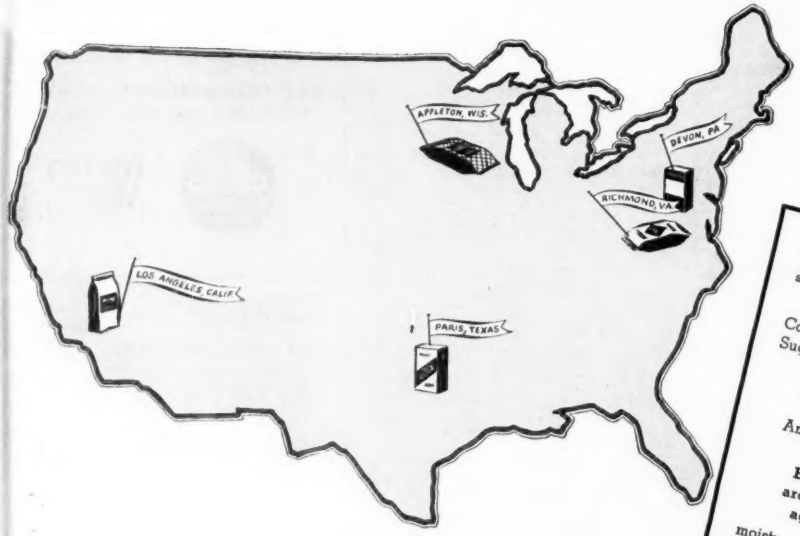
NATURAL B-COMPLEX PRODUCTS: Pure Primary Dry Yeast (brewers' type), Bee-Flex Products, Yeast Extracts, Yeast Extract and Liver, Fortified Yeast with Iron.

Fleischmann's

"First For Food Fortification"

TO EMPHASIZE THAT

5 Betner plants in 5 strategically-located cities give flexibility and economy to Betner's complete food-packaging service



What foods do you process? Where is *your* plant? And what's your problem? We have helped solve packaging problems for scores of different types of foods . . . with many variances in market, weather and transportation conditions.

Satisfied Betner customers, coast to coast, will tell you *Betner Bags are Better Bags.* We'd like to prove that to you.

Remember, ours is a *complete* bag service—from design to manufacture to actual packaging. Why not give us a call?

Your product will GO safely in one of these types of bag

Coffee
Flour
Sugar
Potato chip
Prepared mix
Gelatin dessert
Specialties
And Many Others

Betner bags are "proofed" against . . .

moisture-vapor
grease
insects
water
sifting

Many Betner bags are THERMOSEAL*-ed

This is our patented, heat-sealed closure which gives up to 20% greater protection.

*Trade Mark Reg. U. S. Pat. Off.

Benj C Betner Co DEVON, PA.

CAMP BETNER CORP., Richmond, Va.; BENJ. C. BETNER CO. of WISCONSIN, Appleton, Wisconsin; BENJ. C. BETNER CO., Paris, Texas; BENJ. C. BETNER CO. of CALIFORNIA, Los Angeles, California.; SOUTHERN PACKAGING CORPORATION, High Point, N. C.; Affiliate of Benj. C. Betner Co.

A complete bag service—from idea to finished bag to machinery for closing coffee bags and filling and closing liner bags for cartons.

Men, Jobs, Companies

EDWIN T. GIBSON, executive vice-president of General Foods Corp., has been elected a member of the executive committee. From 1933 to 1947 he was responsible for development of Birds Eye quick-frozen foods.

ROGER H. LUECK, former director of research and since 1944 sales manager for the Pacific region for American Can Co., has been appointed general manager of research, with headquarters in New York City.

PHILIP P. GOTT, president of the National Confectioners Assn., has been appointed a member of a special trade associations committee with the Department of Defense and concerned with the preparedness effort.

GEORGE GELMAN, former technical director of the Quartermaster Food & Container Institute, Chicago, has become executive vice-president of Vico Products Co., Chicago. He did early work in the field of psychometrics.

Industry

Baldwin Oil Mills, Inc., began operations at its new $250,000 soybean crushing mill at Foley, Ala., during October.

Borden Cheese Co.'s Chicago branch has recently occupied its 20,000-sq. ft. warehouse. One feature is a modern loading dock of 800 sq. ft.

Bowman Dairy Co., Chicago, has received a trophy for the highest scoring ice cream tested at the Illinois State Fair. Gov. Adlai Stevenson made presentation.

Buitoni Macaroni Corp. is planning construction of a $750,000 plant at South Hackensack, N. J. Expected to be completed Mar. 1, 1951, it will house the company's entire American operation.

Comet Rice Mills, Beaumont, Tex., has acquired all the capital stock of the Mouton Rice Milling Co. of Harrisburg, Ark.

Florida State Univ., Tallahasse, is offering a four-year course in baking. During first two years, students will do actual baking; last two years will be devoted to special training, with emphasis on chemical and management subjects.

Indiana Assn. of Food Technologists was organized in Indianapolis during August, under leadership of George Schnadenburg, Lilly Research Laboratory.

Knouse Foods, Peach Glen, Pa., will pack and merchandise nationally a full line of premium apple products under the Duncan Hines brand.

Minute Maid Corp. will operate what is to be one of the largest zero storage warehouses in the South. Located in Plymouth, Fla., the warehouse will cost $1,000,000 and have 2,500,000 cu. ft. of storage space.

Oriole Baking Co. has begun erection of a new plant in Baltimore.

Schmidt Provision Co. is expanding its Toledo, Ohio, plant at a cost of $80,000. Prepackaging of self-service meats will be stepped up.

Personnel

S. W. Arenson, formerly chief of research at Doughnut Corp. of America, recently initiated a consulting service known as "Food & Development Laboratory" with offices at 1403 Eutaw Pl., Baltimore, and 1133 Broadway, New York City. Purpose is to render proof and development work to the bakery and potato chip industries.

William Bagley has been promoted to general manager of Krey Packing Co.'s Pacific coast operations.

A. E. Bailey has joined The HumKo Co., Memphis, as director of research. He was formerly with the Girdler Corp.

Robert H. Cain has been elected president and treasurer of the John E. Cain Co., Cambridge, Mass., succeeding his father, the late John E. Cain, Sr.

Edward T. Donahue has been named director of sales of Blatz Brewing Co., Milwaukee.

Bruce L. Durling has been appointed coordinator of sales and research for Wm. J. Stange Co., Chicago.

Thomas Elmezzi has been named to the newly created post of vice-president in charge of manufacturing for Pepsi-Cola Co.

W. C. Haase has been transferred to United Dressed Beef Co., division of Swift & Co., to become manager of the Brooklyn plant upon the imminent retirement of Homer Pierce.

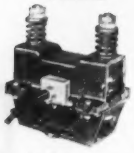
Herbert N. Haberstroh, Jr., of Peter Hand Brewing Co., was the recipient of the Paul Lewis Laboratories scholarship in brewing technology, presented by Wahl-Henius Institute, Chicago.

L. Verne Hass has been elected vice-president in charge of Libby, McNeill & Libby's Hawaiian pine-

SYNTRON
"Pulsating Magnet"
ELECTRIC VIBRATORS

SAVE MANPOWER

SAVE TIME



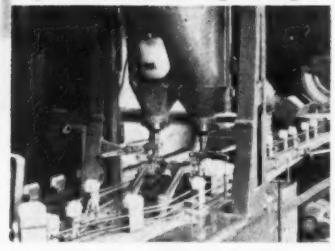
SAVE BINS

3600 powerful vibrations per minute break down arching and plugging — eliminate waste of manpower, production losses and costly replacement of damaged bins.

They can be applied to any size and shape of bin, hopper and chute—whether made of steel, wood or concrete.

Catalog data is available—or write, giving the details of your problem.

ANOTHER ON-THE-JOB REPORT



NO MORE COSTLY DELAYS — Syntron Model V-15, mounted on the packaging machine hopper, eliminated stoppages due to material "arching" and plugging in hopper. Prior to installation of Vibrator it was necessary to shut down the conveyor until an operator pounded the material free again. This Syntron Vibrator paid for itself during the first few weeks.

SYNTRON CO.
460 Lexington Ave. Homer City, Pa.

DR. WILLIAM R. JOHNSTON has been made vice-president in charge of research for Standard Brands, Inc. Formerly director of research, he came with company in 1933 as research chemist at The Fleischmann Laboratories.

---

apple operation, succeeding Philip M. Rodgers.

Edward G. Hellier has been appointed production manager of the Walpole, Mass., plant of Holiday Brands, Inc., crystalline instant coffee maker.

Thomas L. Holling, former mayor of Buffalo, has been elected president of the Pleasant Valley Wine Co., Inc., Hammondsport, N. Y., succeeding the late Charles D. Champlain.

R. R. Laidley, secretary-treasurer, Mickelberry's Food Products Co., Chicago, has been chosen executive vice-president.

Howard Lampman has been appointed executive director, Wheat Flour Institute, Chicago, to succeed his former chief, Lloyd Ellingwood, resigned.

Walter S. Mack resigned as chairman of the board of Pepsi-Cola Co. on Sept. 18, but will continue to serve in an advisory capacity.

Henry McCaw has been appointed vice-president of Swift & Co., to succeed S. W. Lund.

Dean D. Mock has been appointed manager of the newly-formed Dallas district of Pillsbury Mills, Inc.

Roy Robichaux, 1950 president of Chicago Dairy Technology Society, has purchased the Goldenrod Creamery Co., Brodhead, Wis.

Richard M. Steer has been appointed assistant to the president of Holiday Brands, Inc., Boston.

Curtis M. Thomas has been appointed Richmond branch manager for Wilson & Co., Inc., Chicago.

W. W. Widson has been named district manager for Van Camp Sea Food Co., with headquarters in Atlanta.

Associated Industry

American Can Co. plans to expand the can manufacturing facilities at its St. Paul plant, at a cost of over $1,000,000.

Dairypak, Inc., Cleveland, is building a new converting plant at Athens, Ga., for manufacture of paper milk cartons.

Chaffee Design & Mfg. Co., East Aurora, N. Y., has appointed Hardy, Hember & Co. as its representative in the Chicago area.

International Paper Co. plans construction of a paper milk carton plant in Atlanta Ga. Cost is estimated as $500,000.

The Marley Co., Kansas City, Kan., has promoted Roy W. Maze to post of merchandising sales manager.

Manhatten Rubber Div., Raybestos-Manhatten, Inc., has named P. L. Edwards manager of the central district office in Pittsburgh.

Sprout, Waldron & Co., Inc., Muncy,

ELLERY H. HARVEY, founder and past president of the Assn. of Research Directors, and former director at Anheuser-Busch, Inc., St. Louis, has been appointed professor of food technology at Illinois Institute of Technology, Chicago.

for added richness in your food flavors:

CORPS PRALINE

Exceptional results have been achieved in mixtures of fruit and food flavors through the addition of CORPS PRALINE. It is a synthetic aromatic of ketonic nature, whose presence in minute quantities produces unusual, enriched flavor effects.

CORPS PRALINE is a crystalline substance of highest purity, remarkably stable under cooking and baking temperatures. It has a natural-type, fruity aroma when used in fruit flavors; in higher concentrations in mixtures or when used directly in food products, it tastes somewhat like caramel.

Samples and technical information on solubility and methods of application are available.

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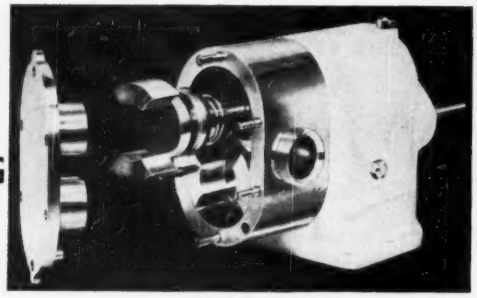
in your FOOD PROCESSING PLANS!



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Because they—

- meet all 3A Sanitary standards
- provide accurate volume control
- handle a wide variety of food products
- have long life
- are easily cleaned

Only WATEROUS Offers All These Features:

Stainless steel construction, easily flushed, self draining sanitary seals, absence of threads and splines in pumping chamber. Accurate volume control, positive displacement at all speeds, under given conditions capacity is in direct proportion to speed. Moves fruit, sandwich creme, vegetables, juices, pulp and concentrates. Operates at high or low temperatures, with thin or viscous liquids and moves semi-solids under pressure or vacuum.

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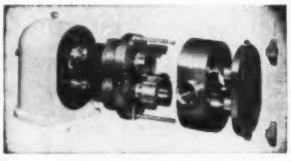
SPEED	50 TO 600 R.P.M.
VACUUMS	TO 25"



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Waterous
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WATEROUS COMPANY
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CHARLES W. KAUFMAN, formerly research director, General Foods Corp., has been appointed executive director of research, Kraft Foods Co., Chicago, effective Oct. 1. He will direct all Kraft research activities, including the new laboratories in Glenview, Ill. Prior to his work with General Foods, Kaufman was active in the research program of the National Canners Association and was also with National Fruit Products Co., Winchester, Va.

Pa., has appointed Raymond Whitcomb to serve the process industries in the Chicago area, and David P. Swan to contact the flour milling industry in that area.

Weatherproof Fiber Box Group has just been formed to expedite production and delivery of fiber boxes in the quantities needed by the miltary during the present emergency. It is a voluntary non-profit organization made up of producers of corrugated and solid-fiber containers. Chairman is John V. Spachner of Container Corp. of America.

Deaths

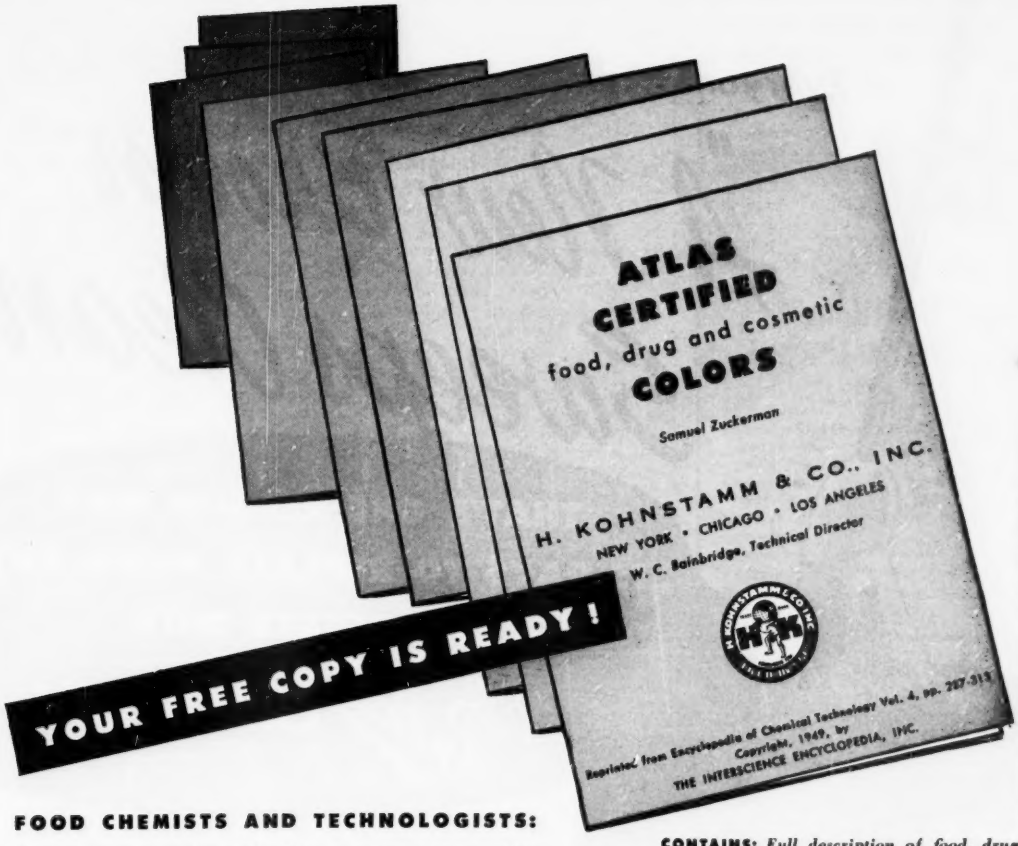
Douglas A. Campbell, 67, president of St. Lawrence Flour Mills—during Sept.

Louis A. Kuhn, 89, retired brewmaster, well known for his gold medal Tivoli beer before prohibition—Sept. 1.

Herman J. Mayer, 75, chairman, H. J. Mayer & Sons Co., Inc., Chicago—Sept. 16.

Curt Michaelis, 58, president of Basic Foods Sales Corp. and leader in the baking industry—Sept. 14.

Thad R. Perry, president of Perry Bros., Seattle, and leader in poultry products industry—Sept. 2. —*End*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Books

Properties of Chemical Raw Materials Are Outlined in New Compilation

THE CONDENSED CHEMICAL DICTIONARY, *4th Edition. Edited by Francis M. Turner. Published by Reinhold Publishing Corp., 330 W. 42nd St., New York 18, N. Y., 1950. 726 pages; 6¼x9¼ in.; cloth. Price $10.*

It is difficult enough for any publisher to keep abreast of developments in the chemical field. For the compilers of a chemical dictionary, the task is almost hopeless. Not quite hopeless, however, since creditable jobs are being done, and this is one of them. About 5,000 new items have been added to this new fourth edition, making a total of more than 23,000 items in the volume.

The book offers a short cut to information on the chemical and physical properties of chemicals and raw materials. It also supplies valuable information on a vast number of chemical specialties along with their trademarks and brand names.

In compiling this edition, the editors have held to the aim of the book's predecessors to serve the needs of the layman as well as the chemist and chemical engineer. For this reason particularly, the book is of value in allied fields, such as food manufacturing, as well as to exporters, importers, brokers, jobbers, and others allied to the chemical fields.

Compiled under the general direction of Francis M. Turner, the actual task of revising and enlarging this edition is credited to Arthur and Elizabeth Rose, of State College, Pa.

Dairy Definitions

A DICTIONARY OF DAIRYING. *By J. G. Davis. Published by Leonard Hill, Ltd., 17 Stratford Place, W. 1, London, England, 1950. 856 pages; 5½x8½ in.; cloth. Price 37s.6d.*

Here is a noteworthy volume prepared for all branches of the dairy industry "from cattle management to manufacturing of dairy products."

The book's definitions cover a wide practical range, with some subjects getting more extensive treatment than others. Most of the longer discussions are provided because of the lack of suitable treatment elsewhere and are written by specialists in their field.

Perhaps a slight drawback to the American reader is the limitation of references to journals that are likely to be available in the British Commonwealth. This will be only a minor handicap, if any, and should not interfere with the book's usefulness in any English speaking country.

Fat and Oil Technology

MELTING AND SOLIDIFICATION OF FATS. *By Alton E. Bailey. Published by Interscience Publishers, Inc., 215 Fourth Ave., New York 3, N. Y., 1950. 357 pages; 6¼x9¼ in.; cloth. Price $7.*

This text was written primarily for the oil and fat chemist and technologist. It departs from most works on these subjects by its emphasis on the correlation and interpretation of the experimental data. The object has been to reveal the interrelationship between different phenomena associated with phase transformation as well as the systematic variations that occur in specific properties of fats with similar variation in their molecular structure.

In discussing the melting behavior of fats, for instance, all X-ray diffraction data are included in order to provide a consideration of their polymorphism—a matter of internal crystal structure. A chapter is also devoted to the solubility of fatty substances in organic solvents.

For those whose knowledge rests in other fields, there is an elementary introduction to relevant physical and chemical principles, along with a review of basic laboratory methods.

Contamination in Foods

FOOD POISONING, *3d Edition. By Elliot B. Dewberry. Published by Leonard Hill, Ltd., 17 Stratford Place, W. 1, London, England,* 1950. 318 *pages;* 5½x8¾ *in.; cloth. Price,* 17*s.6d.*

During the past 30 years, research in the realm of food poisoning has developed a great fund of information. Most of this information, however, is scattered through scientific and medical reports and not readily available to most food producers. Hence, this work of gathering together so much of the available material is

—cut labor costs—
—increase production—
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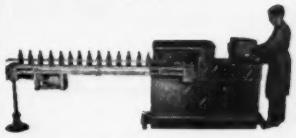

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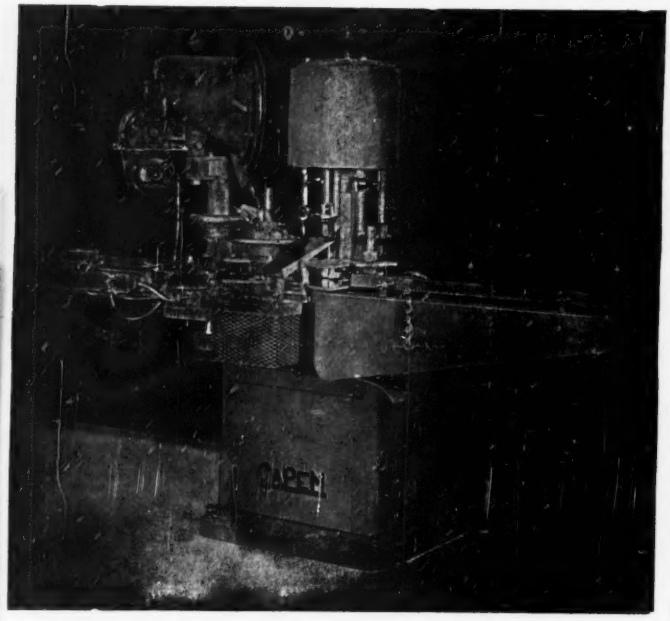

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a genuine contribution to food technology.

The book follows its earlier editions closely, except where more recent information requires revision or complete rewriting of chapters. Considerably more information is offered on ice cream, food handling and food hygiene than appeared in the second edition, published in 1946.

Written by a well known British scientist, the book should dispel many an erroneous idea and provide a convenient reference whenever the subject of food poisoning raises its ugly head.

How Uncle Sam Buys

SELLING TO THE GOVERNMENT. *Department of Manufacture, Chamber of Commerce of the United States, Washington 6, D. C. Price 50c.*

Prepared as a businessman's guide for dealing with the Federal buying agencies, this publication indicates the general nature of the various offices and provides a broad description of the type of material and method of purchasing of items of interest to each.

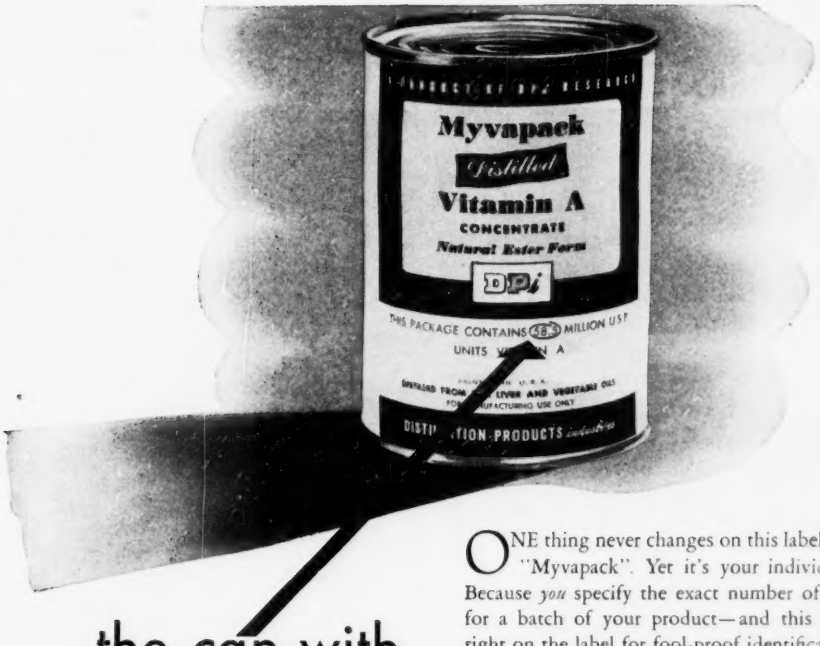
Government Publications

DENSITY OF SOLIDS AND LIQUIDS. *By Peter Hidnert and Elmer L. Peffer. National Bureau of Standards Circular 487. Price 20c.* Describes eleven methods for determinations of the densities of solids and liquids, including hydrostatic-weighing, picnometer, flotation, hydrometer, falling-drop, balanced-column, Boyle's law, electromagnetic, elastic-helix, ice-calorimeter, and volumetric methods.

These recently issued documents are available, at the prices indicated, from the Superintendent of Documents, Government Printing Office, Washington 25, D. C. When no price is indicated, the pamphlet is free and should be ordered from the bureau responsible for its issue.

VARIATIONS IN STATE STANDARDS AND GRADES FOR EGGS. *By Reis F. Pond and Alfred W. Otte. Production & Marketing Administration.* Tabulates specific requirements for grading used throughout the country.

COCOA. *Food & Agriculture Organization of the United Nations. Unnumbered Commodity Report. Available at 25c. from Washington, D. C., office of FAO.* Summarizes data on production, trade, and prices. —*End*



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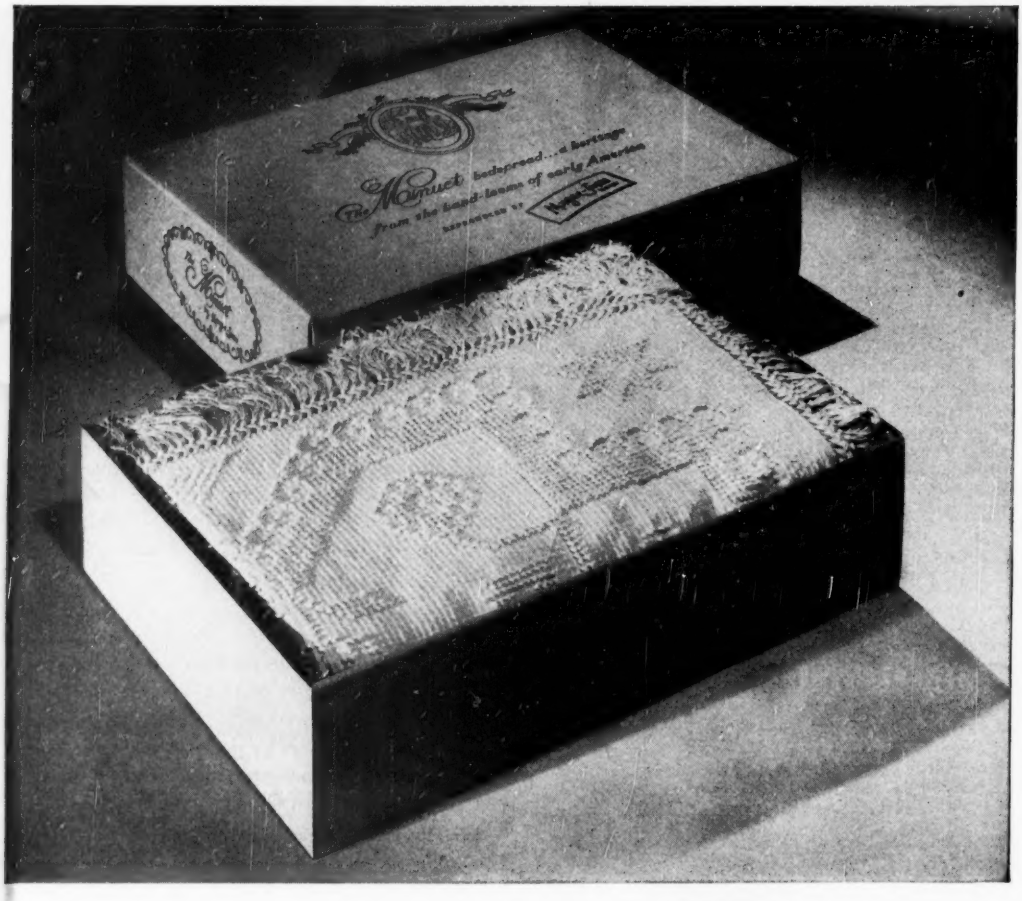

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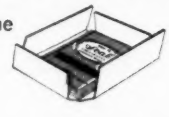

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Equipment Catalogs, Bulletins

Factual Outline on Propyl, Ethyl Gallate A

Present technical knowledge on propyl and ethyl gallate, employed in attacking problems of rancidity and deterioriation caused by oxidation, is saliently briefed in a special 10-page quick-reference brochure. These esters of gallic acid have been termed outstanding anti-oxidants and unique stabilizers for edible fats and oils. Many applications are described, still more are listed. And numerous literature references are included in this handy publication.—*Goldschmidt Chemical Corp.*, 153 *Waverly Pl., New York City* 14.

4-In-1 Release on Speed Reducers B

Parallel shaft and right angle speed reducers—both types in horizontal and vertical models—are fully treated in four new bulletins, 1110, 1115, 2105 and 2110. Punched for insertion in your own looseleaf, each is a 24-page booklet presenting the method of selection, AGMA service factors, horsepower ratings, torque capacities, thrust and over-hung loads, dimensions, standard assemblies and couplings. Input speeds on all four types can go up to 1,750 rpm. with horsepower range from 15 to 2,000.—*The Falk Corp., Milwaukee* 8.

Martin's Aseptic Canning System Detailed C

The comprehensive paper on aseptic canning embodying short-time high temperature sterilization, presented at IFT's decennial conference in May by W. McK. Martin, Schwarz Engineering Co.'s director of research and development, is the feature of a new 54-page publication—*Martin Aseptic Canning System.* Photos and diagrams of aseptic canning equipment and methods available are included to round out the presentation. Distributor of this illustrated reprint, and newly named exclusive sales and manufacturing representative of the system is—*W. F. & John Barnes Co.*, 301 *South Water St., Rockford, Ill.*

Special Catalog Covers Agitators, Mixers D

Portable power mixers, agitator-mixer assemblies, agitator-mixer drives, outside-packed side-entering agitators, and acid-resistant linings for mixers and other processing equipment are delineated in the comprehensive 32-page Catalog 505. Each of the individual equipment presentations include specifications, operating diagrams, photos and application information.—*The Patterson Foundry & Machine Co., East Liverpool, Ohio.*

Food Plant Equipment

Pressure and Temperature Regulators E

Capacities and flow data on pilot-operated pressure and temperature regulators are given in 32-page Catalog 350. There is also a section on self-cleaning strainers.—*Spence Engineering Co., Inc., Walden, N. Y.*

Worm Gear Speed Reducers F

Horsepower rating tables and standard dimensions of line of worm gear speed reducers are described in 36-page Bulletin 130. Improved unit has face-type oil seals.—*The Cleveland Worm & Gear Co., 3249-59 E. 80 St., Cleveland 4.*

Homogenizer G

New "Superhomo" homogenizer is described in 12-page Bulletin G-463. Capacities range from 50 to 2,500 gph. Unit features a new single-phase, or two-phase, homogenizing valve, perforated stainless steel, replaceable valve caps which absorb 98 percent of the wear on the valve and adjustable and re-usable plunger seal.—*Cherry-Burrell Corp., 427 W. Randolph St., Chicago 6.*

Mills and Mixers H

Line of roller mills, colloid mills and mixers is illustrated in 8-page Catalog GP-50. Specifications and dimensions are included.—*Process Machinery Div., Troy Engine & Machine Co., Troy, Pa.*

Centrifugal Pumps I

Open- and enclosed-impellar, self-priming centrifugal pumps are completely delineated in 8-page Bulletin 636.1. Sizes are from ½ to 5 hp., suction lifts up to 25 ft., capacities to 120 gpm., and heads to 135 ft.—*Goulds Pumps, Inc., Seneca Falls, N. Y.*

Ratings on Speed Reducers J

Latest revised AGMA horsepower ratings for worm gear speed reducers are covered in 32-page Bulletin G-WBV. And there is a section on how to select right worm gear.—*De Laval Steam Turbine Co., Trenton, N. J.*

Installation and Maintenance of Traps K

How to install and maintain steam and water traps is set forth in 8-page Bulletin 1721. Repair parts lists are included.—*Armstrong Machine Works, Three Rivers, Mich.*

Industrial V-Belts L

Engineering data and drive selections for general duty and multiple V-belts are covered in 40-page Catalog. Complete calculations, comparison charts and correction factors for belt widths from 17/32 to 1¼ in. are given.—*Durkee-Atwood Co., Minneapolis 13.*

Liquid Packaging Meter M

Automatic dispensing of any preset quantity of liquid from 1 to 100 gal. is enabled with new packaging meter. It is illustrated in 4-page folder. Dial returns to zero after each delivery, and quantities can be changed quickly.—*Bowser, Inc., Fort Wayne, Ind.*

Speed Control Sheaves N

Automatic "Vari-Pitch" sheaves, reported to give instant speed control in 1½ to 40 hp. range, are described in 12-page Bulletin 20B7223A. Selection, installation and operation of belts, sheaves and bases are detailed.—*Allis-Chalmers Mfg. Co., Milwaukee 1.*

Water and Waste Treatment O

"Flocsettler," containing in one unit all features for turbidity removal, water softening and waste treatment, is particularized in 8-page Technical Supplement FL. Unit includes mixing and slurry blending, slurry recirculation, sludge blanket settlings, concentration and removal.—*The American Well Works, Aurora, Ill.*

Automatic Marking Equipment P

Line of automatic marking equipment for cartons, packages and wraps is outlined in 16-page booklet. Chart of type faces is included.—*Industrial Marking Equipment Co., Inc., 7 E. 48 St., New York City 17.*

Four Types of Centrifuges Q

Four-page Bulletin 1259 briefs following types of centrifuges: Tubular bowl, disk, horizontal bowl decanter and crystal dehydrator.—*The Sharples Corp., 2300 Westmoreland St., Philadelphia 40.*

Sanitary Motor R

Varied applications of new-type sanitary motor are featured in 8-page Bulletin 1607. Unit is enclosed. It is finished in baked white enamel.—*U. S. Electrical Motors, Inc., Box 2058, Terminal Annex, Los Angeles 54.*

Wrapping Machine S

Dimensions, package sizes and types, and wrapping speeds of "Super Standard" wrapping machine are given in 6-page folder. Unit turns out 65 a min.—*American Machine & Foundry Co., Bakery Div., 485 Fifth Ave., New York City 17.*

Miniature Speed Changers T

Having high ratios, precision gears and zero backlash, miniature speed changers are tabulated and dimensioned in 4-page Bulletin 100.

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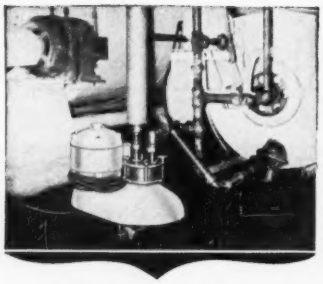
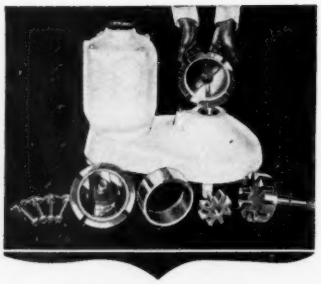


Handy to Use



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The smooth, self-priming action of the Sanitor assures steady delivery without pounding or agitation. It's fast and handy to use in moving milk, cream or any other liquid food product. It's 3A approved.

The simplicity of the Viking "Sanitor" means fast and easy cleaning. Complete pump can be quickly moved to central cleaning without loosening *any thing* but the pipe connection. Or the pump can be dismantled where it is — only 5 large, simple parts, an "O" ring seal and 4 clamp screws. Its *all sanitary*.

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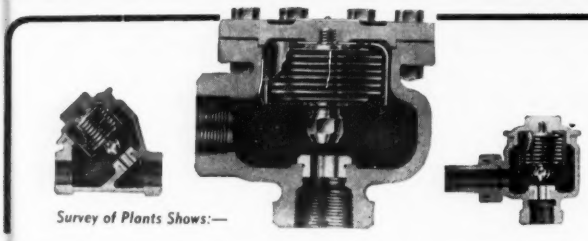

Survey of Plants Shows:—

15 of 20 Engineers Prefer Nicholson Traps

To determine the best steam trap on which to standardize, a large processing firm recently asked their plant engineers for their preference. In 15 out of 20 plants the choice was Nicholson.

The repeated adoption of Nicholson steam traps in plants currently in big "cost-reduction-through-modernization" programs is another indication of their advanced features. To learn why an increasing number of leading plants are standardizing on Nicholson thermostatic steam traps send for our catalog. 5 types for every power, heat, process use; size ¼" to 2"; press. to 225 lbs.

Catalog 250 or see Sweet's

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—*Metron Instrument Co., 432 Lincoln St., Denver 9.*

Close-Coupled Pumps and Motors A

Design and construction features of a close-coupled pump and motor, the "Electrifugal," are described in 6-page Bulletin 52B6140B. Pumps are available in ratings from 10 to 500 gpm. and heads to 220 ft. Motors are rated from ¾ to 10 hp.—*Allis-Chalmers Mfg. Co., Milwaukee.*

Self-Powered Feeder B

Improved features of the Merchen self-powered feeder are contained in 4-page Bulletin TP-68C. Automatic shut-off is available.—*Wallace & Tiernan Co., Inc., Newark 1, N. J.*

Materials Handling

Metal Handling Equipment C

Recently designed skid-box-pallet combinations of metal materials handling equipment are pictured in 24-page Catalog 77. Many plant installations show versatility of line.—*The Union Metal Mfg. Co., Canton 5, Ohio.*

Casters and Trucks D

Entire line of industrial casters, platform trucks and hand trucks is presented in 36-page Catalog CT-50. Specifications and dimensions for every item are included. Price list accompanies catalog.—*The Rapids-Standard Co., Inc., Grand Rapids, Mich.*

Mechanical Vibrating Feeder E

A new "almost fully mechanical" vibrating feeder is described in 4-page Bulletin 134. It draws less than 2 amp. of electricity.—*Hewitt-Robins Inc., Passaic, N. J.*

Bulk Weighing Scale F

Four-page Bulletin 1449 describes new automatic bulk weighing scale with capacities from 200 to 1,000 lb. It is designed to accommodate screw, belt or vibrating feeders.—*Richardson Scale Co., Clifton, N. J.*

Refrigerated Delivery Trucks G

Specifications and illustrations of multi-stop delivery trucks with refrigerated "Metro" bodies are covered in 8-page Bulletin.—*International Harvester Co., 180 N. Michigan Ave., Chicago 1.*

Control Equipment

Laboratory Glassware H

Latest specifications on line of laboratory glassware of "Pyrex," "Vycor" and "Corning" brands are given in 74-page Supplement C to Catalog LP 28. Price list is included.—*Corning Glass Works, Corning, N. Y.*

Feed Water Treatment System I

The "Hot-Z" system for treating boiler feed water is particularized in 6-page Bulletin W-212B7. Discussed are filtration, backwash water, direct contact vent condenser, recirculation, sludge removal and application of the system.—*Worthington Pump & Machinery Corp., Harrison, N. J.*

Laboratory Clamps J

All types of laboratory clamps made of "Alumaloy" are detailed in 8-page bulletin. This alloy is claimed to offer several advantages.—*Schaar & Co., 754 W. Lexington St., Chicago 7.*

New Laboratory Equipment K

Eleventh edition of *What's New for the Laboratory*, 16 pages, depicts following new items: High-speed centrifuge, quadrant culture

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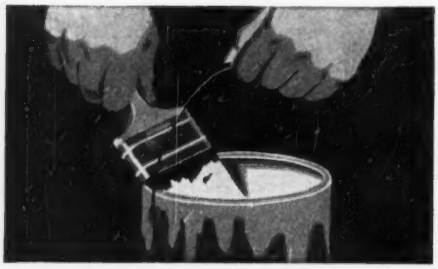

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Plant Supplies

Corrosion-Resistant Paint A

How and where to use corrosion-resistant "Tygon" paint are recorded in 12-page Bulletin 712. Also presented is a very complete table on chemical resistant characteristics of the paint.—*U. S. Stoneware, 60 E. 42 St., New York City 17.*

Tachometer B

Improved hand tachometer with 3-in. dial, single spindle and quintuple selective range is detailed in 4-page folder. It is made for speeds from 30 to 48,000 rpm., or 15 to 24,000 fpm.—*O. Zernickow Co., 15 Park Row, New York City 7.*

Brewery Cleaning Materials C

Guide to Lower Cost Brewery Cleaning, 32 pages, reviews specific materials and cleaning procedures for all plant operations. There is an interesting discussion on the advantages of steam-detergent and hot-spray cleaning.—*Oakite Products, Inc., 22 Thames St., New York City 6.*

Chemical Construction Materials D

Corrosion-proof linings and cements, acid-proof brick and tile, and corrosion-proof brick sheathing, protective coatings and floors are briefly described in 8-page Bulletin MCC 1.—*Atlas Mineral Products Co., 42 Walnut St., Mertztown, Pa.*

Special Research Products E

Amino acids, carbohydrates, nucleoproteins, purines, pyrimidines enzymes, microbiological and bacteriological media are quoted in new 38-page August 1950 Price List.—*General Biochemicals, Inc., Laboratory Park, Chagrin Falls, Ohio.*

Miscellaneous

Glass Insulation Facts F

Engineers and designers are referred to new 36-page booklet, *PC Foamglas*, which contains complete information on normal temperature applications (50-150 deg. F.) of this glass insulation material.—*Pittsburgh Corning Corp., 307 Fourth Ave., Pittsburgh 22.*

Plant Lighting G

Modern concepts of planned lighting for industry are contained in 32-page booklet. Subject is covered from management viewpoint.—*Benjamin Electric Mfg. Co., Des Plaines, Ill.*

Dairy Plant Sanitation H

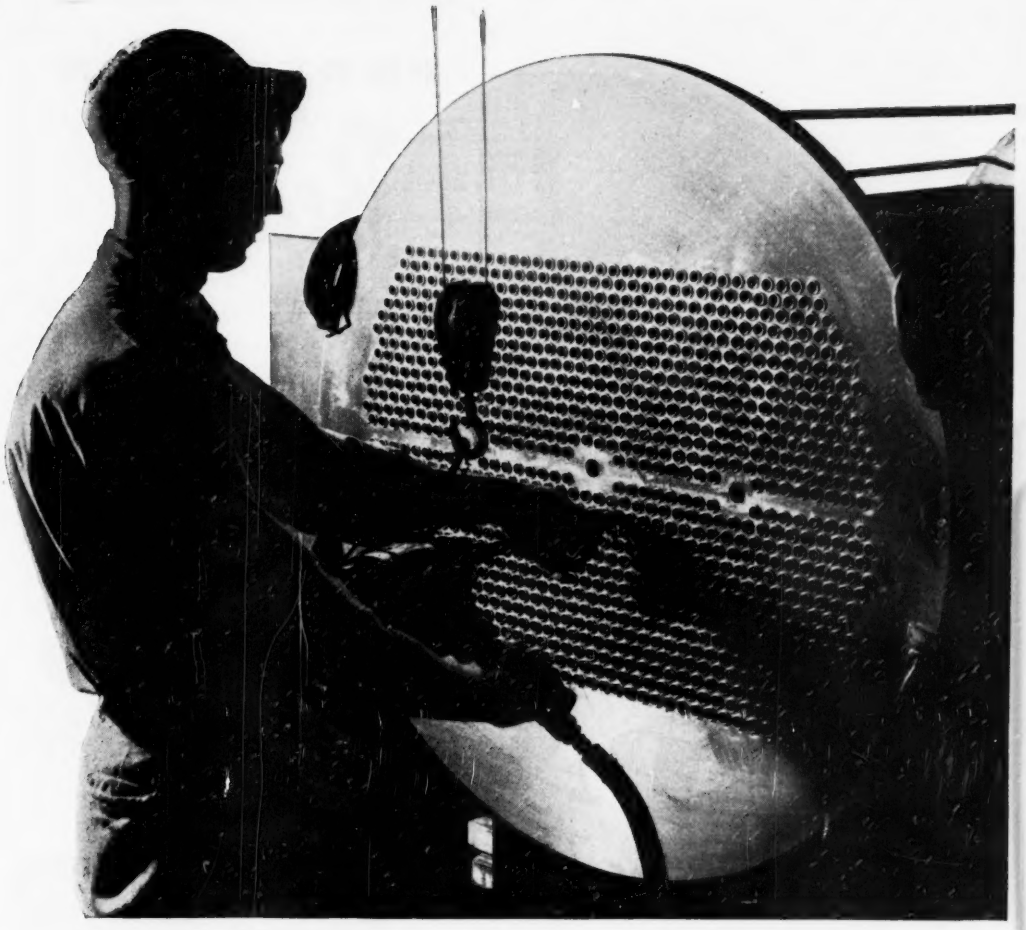
Insecticides in Food Plant Sanitation Programs is publication intended for milk, butter, cheese and egg processors.—*Mill Creek Products, Inc., 4722 Broadway, Kansas City 2, Mo.*

Nickel-Chromium Properties I

Twelve-page Bulletin NS-2 graphs and tabulates chemical and physical properties of nickel-chromium steels. Isothermal transformation diagrams are featured.—*International Nickel Co., Inc., 67 Wall St., New York 5.*

Streamline Filing Systems J

How to Simplify Your Files and Filing Systems, 40 pages, tells just that. It is based on premise that many time-saving, work-saving filing technics are often unknown to average file clerk.—*Remington Rand Inc., 315 Fourth Ave., New York 10.* —End



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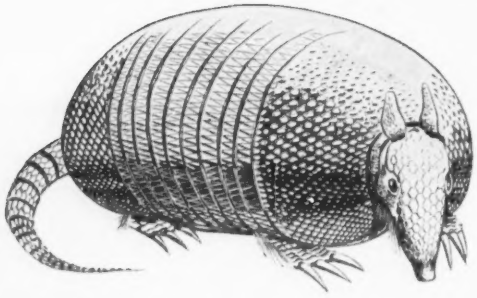

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Patents

Normally Liquid Unsaturated Higher Fatty Acids Separated From Normally Solid Saturated Fatty Acids by Chilling Mixture and Extracting With Solvent of From 0 to −10 deg. C.—*N. V. Feldpush, Upper Darby, Pa., to Wilson & Co., Inc. No. 2,510,015. May 30, 1950.*

Raw Citrus Fruit Juice Simultaneously Pasteurized and Freed of Volatile Oil Content—*G. N. Pulley and M. K. Veldhuis, Winter Haven, Fla., to United States Government. No. 2,510,138. June 6, 1950.*

Flour Aged by Treatment With Gaseous Chloramine—Containing Monochloramine, Dichloramine, or Mixtures—*M. L. Silver, Chicago. No. 2,510,146. June 6, 1950.*

Cherries and Like Mechanically Sliced—*A. B. McLauchlan, Salem, Ore. No. 2,510,291. June 6, 1950.*

Fruit and Like Mechanically Pulped by Action of Revolvable Macerating Element in Cylindrical Housing and Freed of Fibers by Action of Conical Screen Fitted With Spiral Spinner—*L. S. Ross, Oakland, Calif. No. 2,510,420. June 6, 1950.*

Vegetables and Fruits Sliced by Action of Adjustable Disks Rotating in Vertical Plane—*E. J. Toman, San Bernardino, Calif. No. 2,510,435. June 6, 1950.*

Green Unshelled Peanuts Packaged in Sealed Container With Desired Quantity of Water and Salt, Cooked, Cooled, and Held in Sealed Condition Until Ready for Consumption—*W. L. Whitehead, Cottondale, Fla. No. 2,510,534. June 6, 1950.*

Food Treated With Water Solution of Trichloracetic Acid to Destroy Enzymes and Bacteria and Dehydrated Until Substantially Free of Acid—*H. Borsook, Pasadena, one-half to Aaron Sapiro, Los Angeles. No. 2,510,543. June 6, 1950.*

Ice Cream Container Filled by Mechanical Measuring Device—*K. P. Herbold, Brooklyn, N. Y., to Eskimo Pie Corp., Bloomfield, N. J. No. 2,510,576. June 6, 1950.*

Cellulose Saccharified to Provide a Medium Suitable for Yeast Culture—*A. M. Thomsen, San Francisco. No. 2,510,668. June 6, 1950.*

Citrus Fruit Meat Segments Disintegrated Into Small Components With Rupture of Portion of Meat Cells, and With Preservation of Substantial Other Portion of Meat Cells and Formed Into Mixed Product—*J. A. Bruce, Tampa, Fla. No. 2,510,679. June 6, 1950.*

Starch Suspended in Limited Quantity of Water Containing At Least 10 Percent by Weight of Aldehyde, Adjusted to pH 5, and Heated on Rotating Cylinder to Not Exceed 140 deg. C. to Form Cold Swelling Preparation—*J. Lolkema, Hoogezand, and W. A. van der Meer, Haren, Netherlands. No. 2,510,748. June 6, 1950.*

Milk and Other Fluids Pasteurized During Passage Through High Frequency Electric Field in Vacuum Chamber—*G. H. Brown, Princeton, N. J., to Radio Corporation of America. No. 2,510,796. June 6, 1950.*

Fruit Juice Extracted by Action of Vertical Fluted Reaming Element and Freed of Fibers by Passage Through Horizontally Oscillating Strainer—*H. Fromm, Jumbo Gardens, Ontario, Can. No. 2,510,809. June 6, 1950.*

Fruits and Vegetables Coated with Mixture of Paraffin, Vegetable Hard Wax, and Sulphonated Mineral Oil Suitable for Application at Any Temperature Between 32 and at Least 100 deg. F.—*O. P. Greenstreet, San Diego, deceased; E. L. Greenstreet, administratrix. No. 2,510,816. June 6, 1950.*

Sugar Solutions Treated in Primary Ion Exchange System to Recover Glutamic Acid Compounds—*R. T. Jacobs, Twin Falls, Ida., and E. B. Fitch, Westport, Conn., to Dorr Co., Stamford, Conn. No. 2,510,980. June 13, 1950.*

Sausages Linked by Mechanized Tieing—*H. C. Noe, Upper Montclair, to Kidde Mfg. Co., Inc., Bloomfield, N. J. No. 2,510,997. June 13, 1950.*

Doughnut Ice Cream Sandwich Packaged in Container With Inside Diameter Equal to Outside Diameter of Doughnut—*A. Rubin, Naperville, Ill. No. 2,511,082. June 13, 1950.*

Nut Particles Suspended in Nut Oils Emulsified With From 1 to 10 Parts by Weight of Water—*J. H. Mitchell, Jr., Birmingham, Ala., to Stevens Industries, Inc., Dawson, Ga. No. 2,511,119. June 13, 1950.*

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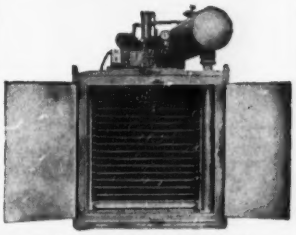

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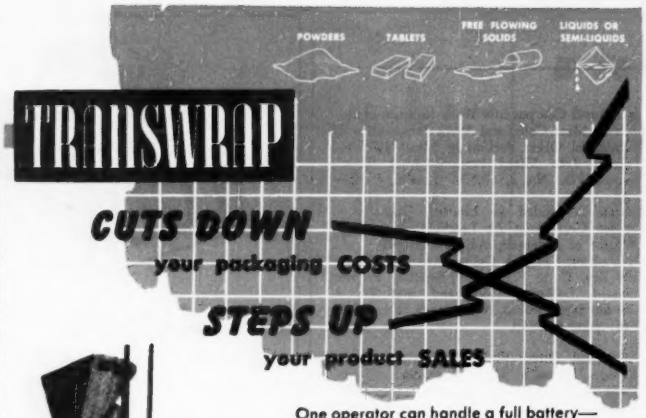

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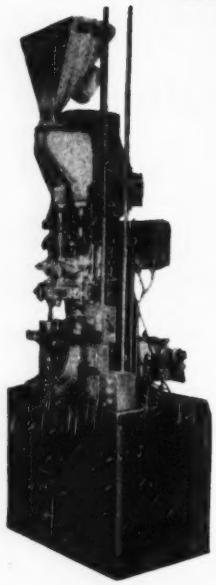

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ture by Adjustment to pH 6.5-7.5 and Addition of More Than 0.2 Percent by Weight of Glycerides of Fatty Acids of C_{16} to C_{18} Series —*J. F. Vincent, Milledgeville, to Stevens Industries, Inc., Dawson, Ga. No. 2,511,136. June 13, 1950.*

Nicotinic Acid Separated in Purified Form From Mixture of Nicotinamide and Nicotinic Acid—*G. H. Carlson to R. P. Scherer Corp., Detroit, Mich. No. 2,511,244. June 13, 1950.*

Fruit Mechanically Packed Into Bulk or Semi-Bulk Baskets—*H. H. Meincke, Howey in the Hills, Fla. No. 2,511,285. June 13, 1950.*

Ice Cream and Other Edible Mixtures Frozen During Continuous Passage Through Refrigerated Hollow Cylinder Fitted With Helical Blade—*L. N. Yohe, Upper Darby, Pa.. Nos. 2,511,313, and 2,511,314. June 13, 1950.*

Juice Pressed From Citrus Fruit During Passage Between Two Endless Compression Belts Fitted With Individual Fruit Holders, Fruit Puncturing Points, and Fruit Supporting Surfaces—*F. W. Rahrer, Lakeland, Fla. No. 2,511,374. June 13, 1950.*

Milk and Other Liquids Rapidly Cooled to Slightly Above Freezing Temperature During Forced Flow at Scouring Velocity Through Heat Exchange Unit Chilled by Refrigerant at Slightly Below Freezing Point of Liquid—*G. Grindrod, Oconomowoc, Wis. No. 2,511,582. June 13, 1950.*

Dietary Frozen Fruit Made to Contain From 0.01 to 0.075 Percent Saccharin and Added Pectin From 10 to 40 Times Saccharin Content—*C. A. Weast, Manteca, Calif. No. 2,511,609. June 13, 1950.*

Fully Soluble Aromatic Coffee Extract Made by Partially Roasting 100 Parts by Weight Green Coffee With About 20 to 30 Parts by Weight of Glucose, Dextrose, or Maltose, Leaching With Water, Concentrating by Evaporation, and Again Roasting Residue Without Caramelization of Sugar to Impair Coffee Aroma—*T. Holzer, to E. Osswald, Zurich, Switzerland. No. 2,511,712. June 13, 1950.*

Antioxidant Made to Consist of Benzoic, Fumaric, Tartaric, or Citric Acid and Alkyl Ester of Gallic or Ascorbic Acids—*L. A. Hall to Griffith Laboratories, Inc., Chicago. No. 2,511,802. June 13, 1950.*

Flakes With Antioxidant Properties Made to Consist of 99.97 to 98.55 Percent by Weight of Solid Hydrogenated Fat Containing From 0.015 to 0.70 Percent of Antioxidant Consisting of Benzoic, Fumaric, Tartaric, Phosphoric, Ascorbic, and Citric Acids and From 0.015 to 0.75 Percent Ester of Gallic Acid—*L. A. Hall to Griffith Laboratories, Inc., Chicago. No. 2,511,803. June 13, 1950.*

Table Salt Given Antioxidant Properties by Inclusion of 0.015 to 0.35 Percent by Weight of Benzoic, Fumaric, Tartaric, Phosphoric, Ascorbic or Citric Acids, From 0.015 to 0.35 Percent of Ester of Gallic Acid and From 0.070 to 0.30 Percent of Non-Toxic Polyhydric Alcohol—*L. A. Hall, Chicago, and L. Sair, Evergreen Park, Ill., to Griffith Laboratories, Inc., Chicago. No. 2,511,804. June 13, 1950.*

Food Perishables Refrigerated During Transportation at High Altitude by Using External Atmosphere as Refrigerant Through Closed Container Having Perforated Covering—*H. W. Protzeller, Fairmont, Minn., one-half to A. W. Nelson, Park Ridge, Ill. No. 2,511,875. June 20, 1950.*

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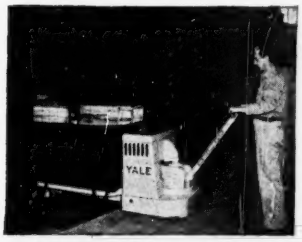

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6. Dual Trailing Wheels in each fork of pallet truck provides wide floor contact . . . easier turning . . . greater floor protection.

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8. Double Battery Protection . . . batteries assembled in steel case . . . fit in Worksaver's totally enclosed heavy steel battery compartment.

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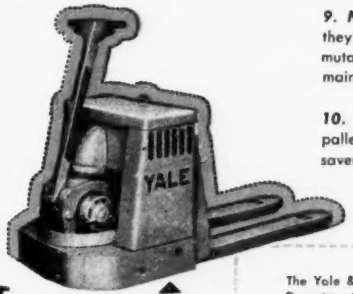
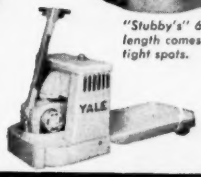
10. Spark Enclosed Features available on pallet and platform type "Stubby" Worksavers.





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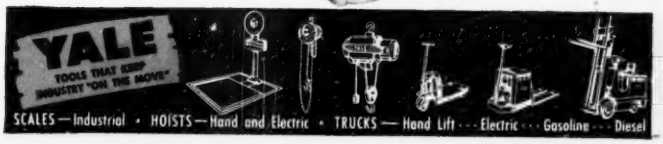
M-10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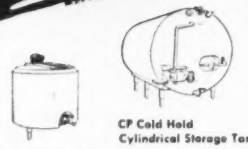

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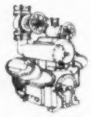

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Dried Fruit Adjusted to 25 Percent Moisture Content, Packaged in Small Fumigant-Pervious Container, and Finally Packed in Large Fumigant-Impervious Storage Container Containing Highly Volatile Fumigant—*E. M. Mrak, H. J. Phaff, and R. E. Whelton, Berkeley, and C. D. Fischer, Fresno, Calif. No. 2,511,987. June 20, 1950.*

Milk Pasteurized in Milk-to-Milk Heat Generator Units Using Pressure-Differential Controlled Auxiliary Pumping System—*R. H. Steinberg and H. Cohen, Chicago, to R. H. Steinberg. No. 2,512,045. June 20, 1950.*

Candy, Cookies, and Like Automatically Packaged in Cartons Consisting of Plurality of Open-Ended Pockets Automatically Made as Ordered From Continuous, Relatively Rigid Strip Material—*O. Sandberg to Lynch Package Machinery Corp., Toledo, O. Nos. 2,512,073 and 2,512,074. June 20, 1950.*

Fowl Stuck and Paralyzed for Slaughtering by Use of Electrically Charged Knife Fitted With Insulated Handle—*C. M. Cervin, Minneapolis. No. 2,512,089. June 20, 1950.*

Milk Mechanically Cooled Immediately After Withdrawal From Udder by Milking Machine—*G. R. Duncan, Washington, Mo. No. 2,512,094. June 20, 1950.*

Beer and Other Carbonated Beverages Packaged in Container Having Body of Plastic Material—*M. van Marwijk Kooij, De Bilt, and A. H. Stomps, Utrecht, Netherlands. No. 2,512,105. June 20, 1950.*

Nuts Shelled by Force of Impact During Passage Through Tube Under Force of Compressed Air—*B. B. Lenhart, Mill Valley, and M. W. McGrath, San Francisco. No. 2,512,107. June 20, 1950.*

Eggs Packaged in Cradle-Type Carton—*C. L. Monahan, Chicago. No. 2,512,111. June 20, 1950.*

Fowl Cleaned With Aid of Rigid Rod of Substantial Length Fitted at One End With Plurality of U-Shaped Flat Metal Straps in Spaced Relation to Each Other—*W. F. Spang, Milton, Mass., to Cube Steak Machine Co., Boston, Mass. No. 2,512,290. June 20, 1950.*

Ground Fish Treated With Mineral Acid Sufficient to Dissolve Bone Content and Modify Proteins Without Hydrolysis—*I. A. Partentjev, Nanuet, N. Y. No. 2,512,375. June 20, 1950.*

Solid and Liquid Foods Packaged in Boxboard Container Sealed by Thermoplastic Adhesive and Having Plurality of Enclosing Walls in Articulation With Each Other—*W. A. Ringler, Wayne, Pa., to The Gardner Board and Carton Co. No. 2,512,383. June 20, 1950.*

—End

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LINK-BELT
SCREW CONVEYORS

7 Better Practices

—*Continued from page 48*

being wrapped. To package 600 1-lb. units of frankfurters, ten workers are required. Three skin the franks, two weigh them in V-shaped metal forms, three wrap, one twists, and another packs them into cartons.

Four workers package about 700 pieces of baked meat loaves an hour. Two wrap, one twists, and another weighs and packs them into cartons.

Six workers handle 800 cut pieces (about 1 lb. per piece) of bologna, Thuringer, or liver sausage an hour. One cuts two lengths of product into twelve pieces in a miter box, three wrap, one twists, and another weighs and packs them into cartons.

Better Distribution

Efficiency, as exemplified by an unusually effective distribution system employing three different sizes of trucks, is the sixth factor in the successful operation of Tobin's Rochester plant.

First off, the big 6-wheelers: Pork products in 20,000-lb. loads are hauled within a 250-mile radius of the plant in fourteen 24-ft. body, insulated, refrigerated trucks—probably the first of this size used in the industry. These mechanically refrigerated carriers are cork-insulated in the floors and Fiberglas-insulated around tops and sides.

To get more uniform distribution of refrigeration in this type truck, a fan unit has been installed in the rear. This is in addition to the two blowers in the front of the vehicle.

Before leaving the garage, trucks are prechilled to about 38 deg. F., with their compressor motors being run by plugging into a 110v. a.c. lighting circuit. The trucks are again refrigerated in the same manner while they are being loaded at the shipping dock. And while on the road, power to drive the refrigeration compressors on most of the trucks is taken directly from vehicle engine.

These trucks are painted white, with blue borders along the body and blue and white lettering. On both sides of the body are huge appetizing pictures of the various pork products—fresh or cooked. Thus, trucks on the road also do a "rolling billboard" job.

Another good feature: Each truck has a sleeping bunk built into the cab to accommodate those drivers who may be on the road for as long as 30 hours.

Second, there are the medium-size trucks. These carry 16,000-lb. loads within a 50-mile radius of the plant. Used are thirteen insulated, 16-ft. Lindsay body vehicles. These are similar to the 6-wheelers, except that they are not refrigerated nor do they have sleeping bunks. They are used chiefly for city deliveries and short country runs, particularly in areas inaccessible to the larger trucks.

And finally, there are four 14-ft. body peddler trucks, which are insulated and mechanically refrigerated. These carry the smaller 3,000-lb. loads of full or broken lots which are sold in small quantities to stores, hotels, and other institutions not reached by the regular salesmen.

Coal Unloaded Mechanically

Seventh of the new developments at Tobin was the installation of a fully automatic system of unloading coal from gondolas and feeding it into the boilers.

Before this new labor-saving and cost-cutting system was adopted, two men had the job of "jockeying" into position a portable, inclined belt conveyor that carried the coal from a gondola to the 50-ton concrete storage bin. And five additional men were needed to rehandle the coal inside the 35-ft. long bin. What's more, the coal had to be unloaded from the same tracks shared by live stock cars and a neighboring plant. This situation not only resulted in delays but also high demurrage costs.

The new coal unloading and stoking system operates in this manner:

Hoppers of 50 to 70-ton gondolas are opened, one at a time, and the coal drops into a 10-ton self-unloading bin sunk below a new second spur track. An inclined drag conveyor then carries the coal to a bucket elevator that lifts it 26 ft. onto a horizontal drag conveyor that transfers it over the original spur track into the storage bin. From the bin, another bucket elevator lifts the coal onto a worm-screw conveyor that feeds into the hopper of a mechanical spreader stoker.

Advantages of Systems

This system has a number of advantages: (1) Coal can be unloaded from a second spur track, without creating other unloading delays; (2) demurrage costs, which sometimes were half the value of the load of coal, are now eliminated; (3) labor required to unload cars has been reduced to a minimum—one man working part time can conveniently handle unloading of a car in less time than it took seven men to do the job the former way; (4) production has been increased, since the maintenance department no longer has to borrow operating department employees to tote the coal; and (5) workers are happier now that they do not have to do the dirty, back-straining job of unloading the coal.

And, with the spreader-stoker system of feeding the coal into the boilers, the company is able to use cheaper coal—bringing annual savings amounting to about $2,000.

The company is also prepared for coal shortages. In the event of a mine strike, the maintenance department is ready to make a quick conversion to oil heating. Held in reserve for such an emergency is a 40,000-gal. storage tank of fuel oil.—*End* (*Resume reading on p. 76*)

Milkstone: Nip It Fast

—*Continued from page 88*

possible to circulate the solution over the equipment, the deposit can be removed by soaking for a longer period.

Second, on vats and flat surfaces, some operators apply a full-strength solution of the commercial product with a soft paint brush, then follow this in a few minutes with vigorous scrubbing and rinsing to effect a satisfactory removal of the milkstone. Other operators prefer to make up their own paste for employment on the equipment.

The daily buildup on plate or internal tubular units can be removed with either acid or alkaline cleaners. However, it is our experience that the acid type has an advantage because the accumulation is largely calcium caseinate, which is insoluble in alkaline solutions. Again, it appears that a double treatment will give best results—that is, first a treatment with an acid-base material, then a follow-up with an alkaline solution and hand brushing of the plates or tubes.

How to Use Combination Method

Here is how this combination method can be utilized to the best advantage in the care of plate units—

1. Immediately after the last milk has passed through, the unit should be flushed with cold water until the discharge is only faintly cloudy.

2. Make up a solution of acid-type milkstone remover, according to the manufacturers directions, and circulate it through the unit for ½ to 1 hr. For best results, temperature of the solution should range from 120 to 130 deg. F. It is well to loosen the press on plate units as far as possible (without getting leakage). This relieves the tension on the gaskets and allows the solution to get around them and thus remove any debris that might be there. It is also a good practice to restrict the outlet with a valve so that the unit is kept filled with solution.

3. Circulate clear water, at 120-130 deg. F., through the unit until the acid is removed.

4. Make up a solution with alkaline washing powder that contains a good wetting agent—using 120-130 deg. water—and circulate it through the unit for 30 min.

5. Separate the plates and go over each individually with a good stiff brush and washing solution. It is not necessary or advisable to use metallic sponges. Tubular units can also be cleaned with a stiff brush.

6. Rinse the plates well with hot water and then with cold water, and allow them to stand open until ready for use the next day.

Some operators have found that it is not necessary to use hand brushing in the above procedure. In most cases, however, brushing is recommended.

It is not advisable for the average plant operator to attempt to compound his own milkstone removers, or for that matter any of his washing powders. Great care must be taken to get an efficient product with no harmful properties. True, there are raw chemicals and acids that can do the job, but the saving is so minute that it is not worth the risk involved.

Reliable manufacturers have developed lines of cleaners that will remove milkstone safely on dairy equipment at cost figures that are much less than is possible with the unmixed or raw ingredients. In general, they have developed products and methods that will give very satisfactory results. Such products have proper penetrating and wetting ability and possess a certain amount of rinsing and water softening powers that the average plant will find of merit.

Acknowledgment

The author is indebted to Ed Wiley, The Wyandotte Chemical Co., and Paul Proctor, Klenzade Products, Inc., for suggestions in the preparation of this material.—*End* *(Resume reading on p. 89)*

Platform Heights

—Continued from page 74

located air valves or electric pushbuttons.

The second type of leveler—the ramp in the ground in front of the loading platform—is commonly used in cases where the length of the vehicle space ahead of the platform is limited. This type wastes no floor or ground space.

The lifting capacity of the ground ramp can be suited to the requirements of the customer. Generally, however, two oil-air cylinders operated off the plant air supply at from 90 lb. to 100 lb. pressure are adequate. Like the hinged platform plate, the ground ramp is raised and lowered by conveniently located air valves or electric pushbuttons.

Prices of the two preceding types of levelers vary from $1,000 to $2,500, according to the sizes and weights involved. The prices quoted include the cost of installation.

As stated, the third type of lift—the vertically-raised platform—is used to load and unload in buildings where no loading platform is provided. It comes in sizes from 4 ft. to 10 ft., has a weight capacity range from 6,000 to 16,000 lb., and varies in cost from $700 to $3,000.

Hinged Throw-Over Plates

When the vehicle loading and unloading is done with fork-lift industrial trucks carrying heavy loads, the hinged-plate type of leveler may be equipped with narrow, hinged throw-over plates. These plates cover the small gap between the end of the truck and the outer edge of the plate, and are equipped with hinged arms or fingers that rest on the floor of the truck.

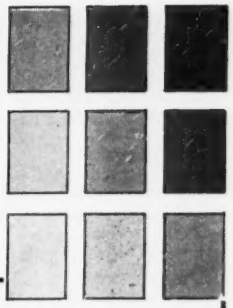
With such throw-over plates and arms or fingers, the pressure in the cylinder is released and the hinged plate rides up and down with the rear of the truck as its springs flex under heavy loads. These hinged throw-over plates and hinged arms are designed to overcome the disadvantages of permanent plates and arms. The latter require that the main hinged loading plate must be raised to a high position before the truck backs in so that these plates and arms can come down and rest upon the truck floor.

If the main loading plate were inadvertently left down and the truck backing in was loaded to the rear door, the permanent throw-over plates and arms might damage the rear of the truck or pierce the goods to be unloaded. However, with hinged throw-over plates and arms, they may be dropped down out of place until they can be safely used.

The leveling plate unit forms a perfect bridge between the truck and the platform and eliminates the sharp rise or hump of the old-style hand-placed loading plate, together with the hazards of its use. The latter included tip-overs of the loads when the industrial trucks hit the loading plate at an angle instead of squarely head on.

Occasionally, the industrial truck strikes the rise or hump so hard that the trailer being loaded is jarred forward, due to improper wheel chocking, and then the industrial truck may fall down between the end of the trailer and the edge of the platform.

JUST OUT



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Also accidental spinning of the wheels of the industrial truck when on the old-style loading plate, may shoot the truck out along the platform floor, breaking the ankles or legs of any platform workers in its path.

In-and-Out Savings

By making it possible for the fork-lift trucks to enter and leave the vehicle bodies by reason of the low angle of inclination, the hinged plates facilitate the use of pallet loading. If the in-and-out loads can be palletized, the fork-lift trucks can run right up into the nose or front of the truck and trailer body and drop their loads without manual labor.

In the same manner, they can unload from the nose of the vehicle without manual labor. It is the reduction of this manual labor that greatly reduces the cost of in-and-out handling.

Even when it is impossible to get suppliers to palletize or to get customers to accept palletized loads, speed in handling and economy in cost are achieved by having the fork-lift trucks take empty or full pallets inside the vehicle body. In unloading a non-palletized incoming load, the goods can be placed on the empty pallets and directly removed by the fork-lift trucks. This eliminates the necessity of unloaders repeatedly walking back and forth inside the truck or trailer to place the goods on the unloading platform.

This same economy can be secured in the reverse operation of pallet-loading an outbound non-palletized load. Compared with manual-labor handling inside long trailer bodies, the combination of the leveling platform, the fork-lift truck, and the pallet can make substantial—and occasionally surprising large—labor savings.—*End* (*Resume reading on p.* 76)

Mechanizing Halves Costs

—*Continued from page* 55

picking", using an empty pallet and the hand pallet truck, when the powered machines are busy.

When loading the trucks for metropolitan delivery, goods are allowed to remain on the pallets, a hand pallet jack being sent along with the load. The driver just drops off pallets as he makes his routes to the chain-store warehouses and groceries, and he picks up the empty pallets next day. This has reduced the terminal time of our truck to a minimum, and each truck can make many more deliveries per day.

The pallet method eliminated need for individual case stacking of production materials on the shipping room floor, and the reloading on 2- and 4-wheeled trucks at time of shipment. This enabled operation of the shipping department with two handlers instead of four.

Mention has been made of specific notable savings in individual areas, but the full value of the new methods can best be shown on an overall cost-per-case basis.

Coded Job Cards Used

Very detailed records are maintained in the plant on labor distribution. They were started, shortly before the materials handling survey was begun, so that we might prove what the cash outlay would actually return to us. The individual department job cards carry a code number for all work performed on materials handling. Sorted and totaled monthly, they give accurate man-hour figures.

Dividing the number of cases shipped in each month into the total man-hours consumed on materials handling of case goods produces an index of material-handling efficiency for the entire plant, enabling comparisons from month to month.

In the six months previous to the use of pallets we used an average of 4.36 man-hours per 100 cases shipped. Since starting the pallet system in February 1949, the average has been 2.30 man-hours per 100 cases shipped. At the average rate of $1.08 per hour for this class of labor, average savings amounts to $2.22 per 100 cases shipped.

At the average of 43,000 cases per month, it amounts to a monthly saving on case goods of $950. An itemized summary of savings per month is as follows: Whole fish handling, $175, skinning and boning, $460, case goods, $950, total, $1,585—or $27,000, in round numbers, over 17 months with the new equipment.

This monthly saving of $1,585 paid for the equipment in the first 8.5 months and has earned an equal amount for the company in the last 8.5 months. A cost list on the equipment, purchased in 1948, follows:

750 pallets	$1,275.00
100 pallet boxes	890.00
1 fork truck complete	3,035.00
2 Pedestrian-motor trucks, complete	4,984.00
3 hand pallet trucks	1,104.00
2 magnesium ramps	600.00
1 magnesium dock board	150.00
70 steel floor plates, installed	1,400.00
2 truck dollies	48.00
Total cost, delivered	$13,486.00
Less credit, 40 obsolete trucks	75.00
Net cost of equipment	$13,411.00

When the average plant attacks a problem, it's seldom that everything works out according to plan, despite all the care taken to avoid pitfalls and errors. Hence, the engineer should always be conservative in his estimates of proposed savings. Further, he should discuss his plans thoroughly with the "old timers" to apprise himself, as much as possible, of unforseen "bugs" peculiar to the operation in question.

We experienced such an unforeseen "bug" in selecting material for construction of fish pallet boxes. On the basis of materials costs, we elected to use box pallets made of hard wood, instead of stainless steel wire, for handling loose salt fish. We knew that salt fish is stored in wood tanks and shipped and stored in wooden boxes, hence no one could see any reason why a wooden pallet would not be satisfactory. Accordingly, 100 such pallets were purchased.

It was not until six months later that we discovered a blackening of the wood in contact with the fish, also discolorations of the fish itself and considerable mold growth. We then discovered that hard woods (deciduous) produce that effect in contact with salt fish, and that soft woods from coniferous trees are always used for boxes and tanks for salt fish.

We made a frantic search for a way to counteract this trouble—and ultimately found non-toxic substances which could be sprayed on the pallets to inhibit the mold growth. We used two of these substances. "Nuodex" and "Calresen," and found them equally effective.—*End* (*Resume reading on p.* 56)

WRRL "Puffs" Potatoes

—*Continued from page* 45

sugar, monosodium glutamate, and salt, singly or in combination, have already been incorporated successfully. Sprinkling these agents in a powdered form over the blanched potatoes is feasible. Generally, though, the flavorings have been added to the blanching water (non-water-soluble materials were suspended in 15 percent starch solution). In this manner, uniform color and flavor distribution were obtained throughout the product.

Samples of the puffed potatoes have been stored at room temperatures in loosely covered containers. The puffs stayed in excellent condition for over four months. Thus, kept in a dry and cool place, the shelf life of the product is adequate for commercial use.

Factors Affecting Puffing

Principal controllable factors affecting "puffability" of a potato piece are size and drying temperature.

Length and width of the potato strip may be varied (see first photo), but a ⅛-in. thickness appears to be optimum. Thinner pieces sometimes puff unevenly; those thicker often puff on each side, leaving a hard, dense bridge through the center.

Little or no puffing occurs when the temperature is below 250 deg. F. A good range is between 300 and 340 deg. F. These temperatures apply specifically to White Rose and Russet Burbank potatoes, the only two types used in the research. No doubt good-quality potatoes of other varieties would be suitable.

Puffed potatoes, of acceptable quality, occupy from 1.6 to 2.0 times the space of dehydrated ones. One pound of the puffs requires a package 4x4x 3.5 in. (56 cu. in.).

Blanching a potato strip adds gloss to the finished puff by hydrolyzing the surface starch. Holding for 1 min. in 7 percent salt solution (NaCl) produces an attractive gloss and a good flavor.

This article is based on a report of a study made under the Research & Marketing Act of 1946. The authors are grateful for the helpful suggestions of C. E. Hendel and R. L. Olsen also of the Western Regional Research Laboratory.

End *(Resume reading on p. 46)*

40 Years of Growth

—Continued from page 51

cent from current levels. This is only a tentative suggestion that may require revision in the light of new information and keener insight.

Referring to Table III—giving production indexes of manufactured foods and related categories—it should be noted that the index of food manufactures (and the index of total manufactures) measure, largely changes in net physical output. That is, increased fabrication of given quantities of materials tends to be registered as a net increase in manufacturing output. Of course, an increase in amount of materials, subjected to a constant amount of processing per unit, also registers an increase in the output index. This is shown as follows:

The index of manufacturing was constructed from individual industry indexes weighted by the value added in each industry. This procedure is analagous to assigning margin weights to the individual indexes. Since margins may be regarded as the price of processing services per unit of output, they are clearly appropriate as weights in an index of net physical

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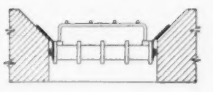

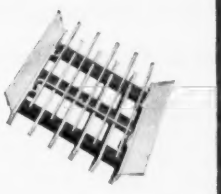

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DOUBLE and SINGLE DISC ATTRITION MILLS
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. . . reduce material-handling costs . . . save man-hours

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The Electric Industrial Truck Association

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output of the manufacturing segment. Thus, if we define value added by an industry as equal to the sum of product quantities times margins, Σ (q x m), then—

$$\frac{\Sigma\left(\frac{\Sigma q_1 m_0}{\Sigma q_0 m_0} \cdot \Sigma q_0 m_0\right)}{\Sigma\,(\Sigma q_0 m_0)} = \frac{\Sigma\,(\Sigma q_1 m_0)}{\Sigma\,(\Sigma q_0 m_0)}$$

which is essentially the index of net physical output used. However, there are some reservations about the netness of this measure: Since the individual industry indexes were constructed by weighting the quantities of each product by factory prices (and not by margins) they are measures of the gross physical output of the individual industries. The left hand formula actually was—

$$\frac{\Sigma\left(\frac{\Sigma q_1 p_0}{\Sigma q_0 p_0} \cdot \Sigma q_0 m_0\right)}{\Sigma\,(\Sigma q_0 m_0)}$$

Gross output indexes accurately measure net output indexes only where production coefficients (p) remain unchanged (where margins are proportional to factory prices). Therefore, the indexes presented in this paper should be regarded as approximate rather than as accurate measures of net physical output. The bias in the indexes presented probably is downward. See Fabricant, *op. cit.* ch. 2—footnote (b) of Table III—for a more detailed discussion on these points.

End (*Resume reading on page* 52)

Low-Cost Packaging

—*Continued from page* 57

new packaging method is that the machine can be run for longer periods—over an hour—without changing the rolls of cardboard and cellophane.

Old Method Was Slow

But let us tell the story of these efficiency changes from the beginning:

In the old bagging system, several workers dumped pies from tins and delivered the depanned pies to the packers. Then each packer opened the bags, inserted the pies, and packed four pies to a tray. The packers also had to set up the trays.

By merely installing a pneumatic bag-opening device for each packer, and two conveyor belts—one for the pies and the other for trays—production was, as stated, stepped up about 35 percent. Instead of workers supplying each packer with pies—as in the former method—one girl unloaded the pies from racks, another

dumped them from a strap of pans, and still another placed them in paper cups on a Neoprene-belt conveyor that carried them to six packers. And instead of the packers setting up the trays, another girl fed them, already made up, onto a canvas-belt conveyor.

The girls at the packing station quickly agreed that the job of bagging pies was easier and less fatiguing.

Facing the two conveyors, the six packers picked pies delivered to them on the top belt and dropped them into bags that were opened by the pneumatic device. Then they packed four pies in a cardboard tray, which came to them on the lower belt. Trayed pies finally went to the sorting station, where one girl loaded them into delivery boxes and another girl racked the boxes.

The bag-opening unit comprised: (1) A curved copper chute that held 300 empty bags, (2) a 1½-lb. pendulum which exerted weight on the back of the stack of bags, and (3) a flat nozzle on top of the unit and through which air, under 5 lb. of pressure, blew each bag open.

While this method was much better, it actually was only a start on the road to improvement. It was only after the cartoning machine was installed that pie-packaging was actually mechanized for the first time.

Cartoning Unit Raises Output

Here are pertinent details concerning the cartoning machine and how it operated:

First step in the machine's many tasks was setting up the cartons. These self-locking cartons were magazine fed in the flat form into the unit, which then automatically formed them without the aid of an adhesive. Next, the cartons were ejected onto a chain-belt conveyor with metal lugs that kept them properly spaced. After forming, a marking unit imprinted the variety of the pie on the carton. Different colored inks were used each day, thus doing away with code numbers.

Just before pies were fed into the cartons, paper plates were inserted. These plates were fed from the bottom of a magazine by a vacuum cup.

Being then ready for the pies, the cartons were conveyed to the packing station, where a girl dumped four pies at a time from a strap of tins. Another girl picked two pies at a time from the belt and placed them in the cartons.

Closing the cartons was the final step done by the machine. Here, one end of the top and two flaps along the sides were tucked in the carton.

Finally, a girl arranged the cartons in wooden trays before they were racked, ready for delivery.

LYNCH CORPORATION of Toledo, Ohio,
—a leading manufacturer of packaging machinery

The following quotation is taken from a letter we received from their Director of Sales:

"The majority of our machines are used in places where it is necessary to wash them with steam and hot water after each day's use. This naturally would remove any ordinary lubricant and trouble would develop if the machines were not immediately relubricated. With LUBRIPLATE it is different. There is always a film of LUBRIPLATE left on the machine after washing. This gives protection not only to moving parts, but also prevents general corrosion. The presence of salt and lactic acid in packing plants makes oxidation a hazard. LUBRIPLATE prevents this too.

"LUBRIPLATE greatly reduces unnecessary wear and prolongs the life of machines. It has reduced customer calls for service to a minimum. Our Service Engineers can readily spot machines that have had other than LUBRIPLATE Lubrication, as these machines do not give the service they should.

"After using LUBRIPLATE for over ten years, we are very well pleased with it and enthusiastically recommend it."

A LUBRICANT must be more than good to warrant such a recommendation. The Lynch Corporation, as well as hundreds of others who build machines to sell, not only use LUBRIPLATE Lubricants in their own shops, but also advise the buyers of the machines to always use LUBRIPLATE for re-lubrication.

LUBRIPLATE Lubricants are different from all other lubricants. They have properties all their own . . . they reduce friction and wear, prevent rust and corrosion and save power. They stay put under most adverse conditions and do not run out or wash away.

There is a LUBRIPLATE Lubricant that is just the right density for your requirements. Let us tell you about it. *Write today.*

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LUBRIPLATE ***THE MODERN LUBRICANT***

"The Multi-Clean Method keeps floors gleaming, sanitary, non-slippery, easy to maintain"

SAYS THIS BAKERY PLANT MANAGER*

"After using the Multi-Clean Method and Multi-Clean Bakery Floor Preserver on all our wood floors for nearly a year, our floors have looked better and have been easier and safer to work upon than ever before."

MULTI-CLEAN BAKERY FLOOR PRESERVER AND THE MULTI-CLEAN METHOD ADD BEAUTY AND LONGER LIFE TO WOODEN FLOORS

Pictured above is only one of thousands of wooden floors in the Food Industries kept bright, attractive and easy to clean by Multi-Clean Bakery Floor Preserver and the Multi-Clean Method. Its gleaming surface reflects proper maintenance with the right combination of custom cleaning chemicals and equipment.

Multi-Clean Bakery Floor Preserver was selected because it penetrates the pores of the wood, sealing all cracks and crevices against infestation and bacteria growth. It dries *quickly* . . . usually within 1½ hours . . . and forms the durable, protective coating required by heavy traffic areas. If necessary, worn spots can be patched easily without showing laps.

Multi-Clean All-Purpose Floor Machines are used to scrub and prepare the floor. Multi-Clean Wet or Dry Vacuums are used to pick up the scrubbing solution so the floor will be completely dry before preserver is applied. These same machines are also used during periodic maintenance for cleaning and polishing the floor to insure long-lasting retention of its beautiful, sanitary surface.

FREE REFERENCE FILE ON FLOOR MAINTENANCE

Not just for wood but for every type of floor, there is a Multi-Clean Method which will solve your maintenance problems. If lower maintenance costs and better looking, safer floors are important to you, send for the free manual describing the specific Multi-Clean Method for your floors.

*Name and case history available upon request.

MULTI-CLEAN®
PRODUCTS, INC.

Multi-Clean Products, Inc.
2277 Ford Parkway, Dept. 35A
St. Paul 1, Minnesota

Gentlemen: Send me this case history on Bakery Floor Preserver and also the maintenance manuals which I have checked below:

☐ Linoleum ☐ Asphalt Tile
☐ Terrazzo ☐ Rubber Tile
☐ Concrete ☐ Wood

Name.....
Address.....
City.....Zone.....State.....

Custom Cleaning Chemicals • Floor and Rug Machines • Permanent Floor Finishes • Industrial Vacuums

Still this system was not deemed good enough. Actually, the cost of the carton was too high, and the speed of the packaging operation had to be increased. By designing a machine that cuts and forms a boat from roll-fed, waxed cardboard paper and then overwraps the boat with roll-fed cellophane, the company has now brought about a sharp reduction in cost of the package, and speed of the operation has been increased.

This is how fast-packaging is accomplished with the new machine:

First step in the operation is forming the boats. Printed waxed cardboard is from a 30-in. roll, that holds enough board for 8,600 boats. Just before the boat is formed, the cardboard travels past an electric eye for accurate registration—prior to cutting and imprinting the variety on the boat. Next, the cardboard is continuously fed through a shaper—two channel irons—that fold the two sides. A guillotine-knife then cuts the folded cardboard into boats.

The boats now pass through a marker that imprints the variety on their sides. From the marker, the printed boats are ejected onto a chain-belt conveyor that feeds them to the wrapper. Just before the boats are wrapped, a girl fills them with pies. Boats are next wrapped with unprinted cellophane and heat sealed. Finally, the pies are placed in snap-opening-type cartons—six pies to a carton—which are loaded in racks.

This new machine handles 90 packages a minute. Only four workers are needed on the line. One dumps pies from tins. Another feeds them into boats. And the other two girls arrange the pies in cartons and rack them.—*End (Resume reading on p. 58)*

QM Food Acceptance

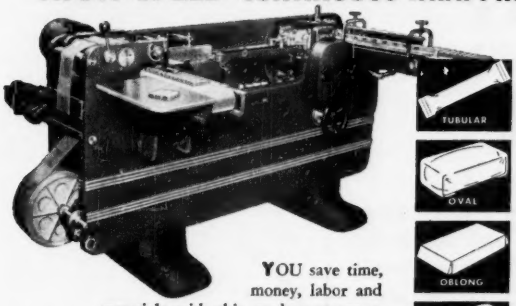
—Continued from page 86

of measurement that are available in this field must be considered inadequate.

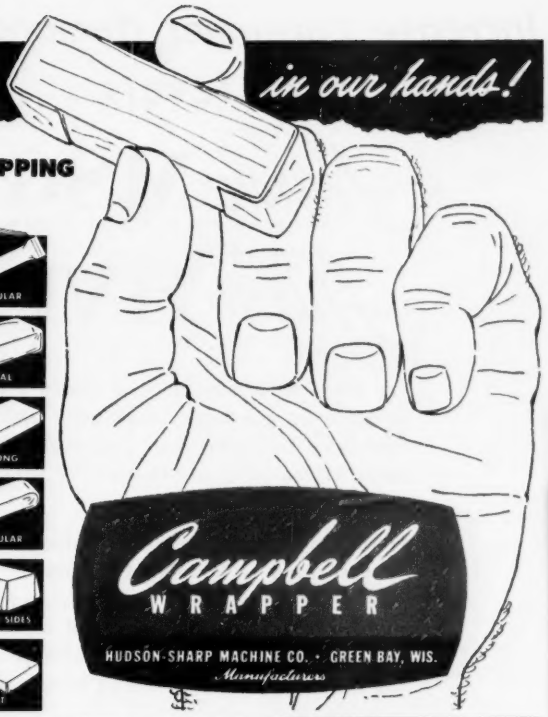
To make matters worse, there is a woeful lack of methodological standardization among the various groups who are doing such work. Particular test methods are so variable, as also are the basic approaches, that often results have no meaning outside the laboratory where they are obtained. One result is that any laboratory, in order to work effectively and with assurance, must concern itself with methodology—selecting, developing, originating, and validating procedures to fulfill its own purposes.

Put your PACKAGING *in our hands!*

HIGH SPEED CONTINUOUS WRAPPING



YOU save time, money, labor and materials with this modern wrapper. Only one operator and one helper are required to deliver up to 150 units per minute, fully glued or heat sealed. Wraps products of all shapes with any type of wrapping material — without stiffeners, unless desired, and without breakage! Ideal for numerous varied products and also available with hopper feed for stick candy and similar cylindrical items. Write for illustrated brochure and complete information.



DC ANTIFOAM A

the most versatile and efficient defoamer on the market

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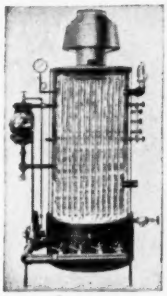
CLEAN, AUTOMATIC STEAM . . .

AS YOU WANT IT, WHERE YOU WANT IT



The KANE Boiler, built to A.S.M.E. specifications, in sizes to 30 H.P.

Each KANE BOILER PACKAGE is carefully considered by us as an "individual" job,—from the customer's requirements to the finished unit. And each BOILER PACKAGE is a compact, self-contained steam source that includes: the correctly sized KANE Automatic Gas-Fired Boiler complete with gas burner and controls to maintain required steam pressure; and an M-K-O Automatic Boiler Feed system designed to return condensate and supply make-up water as required for highest operating efficiency.

The M-K-O Automatic Boiler Feed returns condensate and supplies small quantities of hot water as needed to the KANE Boiler.

Engineered Steam at its best with four decades of experience at your disposal—so, send your steam problem to us for study and recommendation.

ENGINEERED STEAM AT ITS BEST

MEARS·KANE·OFELDT INC.

CHURCH ROAD, EAST OF CROOKED LANE, UPPER MERION, PA.

FOUR DECADES OF AUTOMATIC GAS-FIRED BOILER MANUFACTURING EXPERIENCE.

Increase consumer demand . . . Raise flavor levels . . . with

Huron MSG
MONOSODIUM GLUTAMATE 99+%
and
Huron HVP
HYDROLYZED VEGETABLE PROTEINS

For that perfection in food flavor which assures enthusiastic consumer acceptance and continuing demand . . . many food processors have already found Huron MSG and Huron HVP valuable aids in raising flavor levels.

Huron's specialized service is always available to suggest ways of obtaining maximum taste value consistent with economy through use of Huron MSG and HVP. To those who have not used our service, we suggest a simple way in which you can prove the advantage of using Huron MSG and HVP. For example, in

SEAFOODS:

In a multitude of foods of the sea an appropriate amount of MSG heightens the flavor and retains fresh caught goodness. Clam and fish chowders are best improved by the addition of MSG at 0.15%, while richer and more viscous products such as crab and lobster bisques require a slightly greater amount ranging up to 0.2%. Solid packs of both salmon and tuna are raised in flavor quality with use of 0.15% MSG. Canned oysters and clams, whole or minced, require only 0.1% MSG for significant flavor improvement, while lobster, crabmeat and shrimp all are benefited through the addition of 0.15% MSG. Fish pastes, because of their high flavor intensity and high salt content, require the addition of 0.25% to 0.5% MSG for maximum flavor value.

Call on us in confidence for assistance. Samples will be sent immediately with specific recommendations.

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This condition stems from two causes. First, and unavoidable, is the fact that technics of measuring human behavior have never been established to the same degree of precision which obtains in other sciences. Psychology, through the science of psychometrics, has made much progress over the past 70 years, but for the most part has contributed only general principles. Specific applications have been left to those in the special fields. Since acceptance is a new field wherein highly specialized requirements have arisen, there is no established source from which complete and ready-made solutions can be borrowed.

Tendency to Follow Tradition

Second there is the situation that most of the interest in food acceptance has been among people whose specialty is food, not human behavior, and who have been trained in home economics and various aspects of food technology, or else in advertising, marketing, and other administrative functions. Following the path of least resistance, there has been a tendency for these people to follow the old "expert" tradition of evaluation. Consequently, there has been widespread failure to take advantage of even the non-specific help that science had to offer.

At the QM Food & Container Institute, the methodology aspects of the total problem are considered urgent, and a good share of the total effort in acceptance work is devoted to them. Three separate research objectives are set forth in the current program: To originate, develop, and validate (1) laboratory methods for sensory testing, (2) appropriate statistical designs and methods of analysis for such test results, and (3) procedures for field testing of military rations.

Logical Background

This constitutes formal recognition and provides a logical background for work that must of necessity be done in order to accomplish the basic mission of acceptance work. Here, the approaches are to evaluate methods that have been used elsewhere and adapt them to specific problems where possible, to originate new methods derived from the general principles of psychometrics, and to test all methods on the criteria of reliability and validity.

Details of food-acceptance determinations and descriptions of foods in terms of sensory properties will be presented in our tenth QM article in December FI.

End (*Resume reading on page* 87)

some things need experience

Putting stainless steel to work in a given application requires experience. Since stainless is a whole family of steels, the *right* analysis must be used . . . or stainless steel will not function properly. That's why Crucible, pioneer in the development of this specialty, offers you, freely, the experience of an alert metallurgical staff. These engineers and metallurgists know which stainless fits your job best . . . and their advice can save you time and money in applying stainless steel to your requirements.

The painstaking care Crucible shows in finding the best answer to Industry-posed problems is the measure of Crucible's half century of specialty steel leadership. Put this experience to work for you. And, whether the order is in tons or pounds, your problem is assured prompt attention. When it's stainless...call in Crucible. CRUCIBLE STEEL COMPANY OF AMERICA, Chrysler Building, New York 17, N. Y.

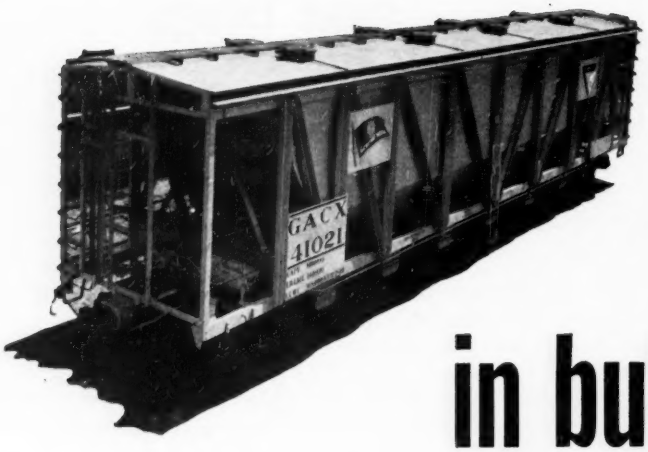
CRUCIBLE first name in special purpose steels

STAINLESS STEELS

fifty years of Fine *steelmaking*

STAINLESS • HIGH SPEED • TOOL • ALLOY • MACHINERY • SPECIAL PURPOSE STEELS

now! ship flour in bulk!



General American, builder and operator of the GATX tank car and GARX-URTX refrigerator car fleets, now offers a new leasing facility to industry—Trans-Flo Car Service.

The Trans-Flo Car does for flour what the tank car has done for bulk liquids. It is being made available on a rental basis to give shippers the same economies, the same dependable standard of service GATX rendered to tank car users.

A few of the big advantages of Trans-Flo Car Service:

You make no capital investment in cars; no problems of ownership. The pneumatic equipment used with Trans-Flo will reduce your production costs and speed up manufacturing.

No packaging, individual handling or dunnage. No contamination in loading, shipping and unloading.

Each Trans-Flo Car carries from 55 to 60 tons pay-load compared to a box car's 30 to 40 tons. The more you use the Trans-Flo Car—the more you save!

Comprehensive tests by an outstanding research laboratory prove that the Trans-Flo method of loading and unloading materially reduces possibility of infestation.

Write for complete information on Trans-Flo Service

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San Francisco • Seattle • Tulsa • Washington
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TRANS-FLO GENERAL AMERICAN TRADE MARK

GENERAL AMERICAN
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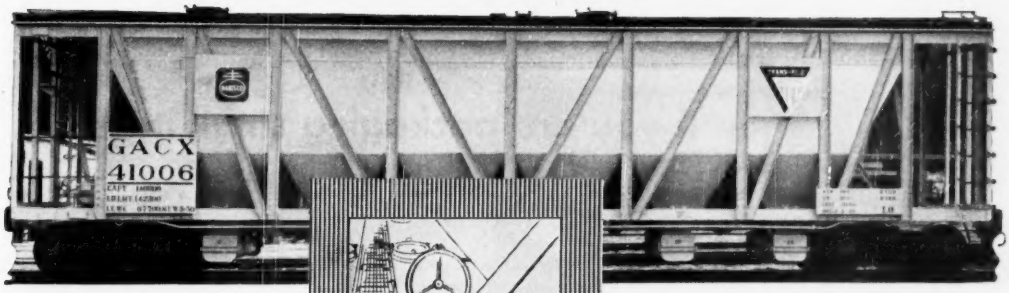
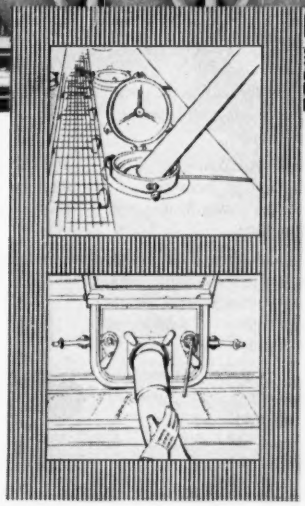
The new

Trans-Flo® Car

by General American eliminates filling, handling and shipping of small units





No Contamination!

Big Savings!

Compare box car methods with Trans-Flo Airveyor loading and unloading!*

Loading is direct from your source of production.

Box Car loading time.....16 man-hours (avg.)

Trans-Flo loading time..... 3 man-hours (avg.)

Unloading—a one-man job. Just hook up nozzle!

Box car unloading time.....16 man-hours (avg.)

Trans-Flo unloading time.....4 man-hours (avg.)

*T. M. The Fuller Co., Catasauqua, Pa.

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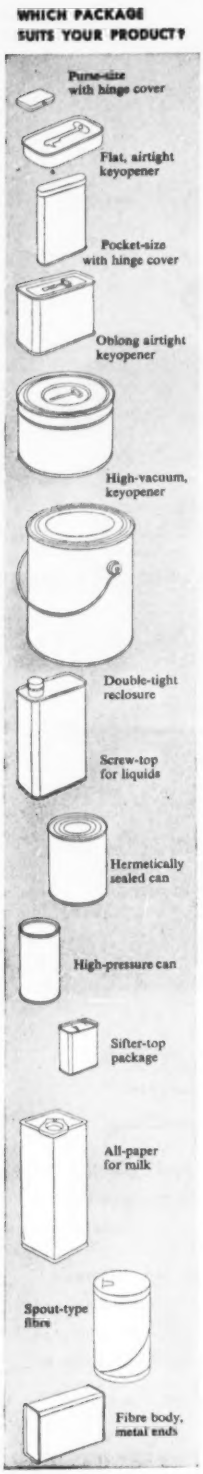

Attached cover, smooth edges, snaps closed with bead lock giving rigidity to top surface with no distortion. Opens, closes with one hand. Can be coated inside, body, top and bottom if desired.
Contents readily accessible as top swings back and provides completely open container. Top aperture is wide enough to permit user to reach in with fingers and pick out contents. Comes in four sizes.

If you are packaging small items used in small quantities...

This container is most familiar as the package for short lengths of adhesive tape used for minor cuts and bruises.

Notice that the hinged snap-top opens easily, protects the contents from dust . . . that the package makes a nice display and keeps clean after handling.

Perhaps you are packaging cold tablets, salt tablets, rubber bands, nails, nuts, bolts, playing cards, king-size cigarettes, whole spices, notions, buttons, *or some other small item used in small quantities.*

Might it not be a good idea for you and us to sit down together and see how our know-how might help you?

Pioneers, we . . .

Since 1901, Canco has been creating new and more effective packages. There is hardly a major development in the packaging field that this keen organization has not pioneered.

We can advise you on how to build sales, cut costs, improve processes, and on filling and closing procedures. We stand ready to serve you promptly in production-line emergencies. *Call Canco first!*

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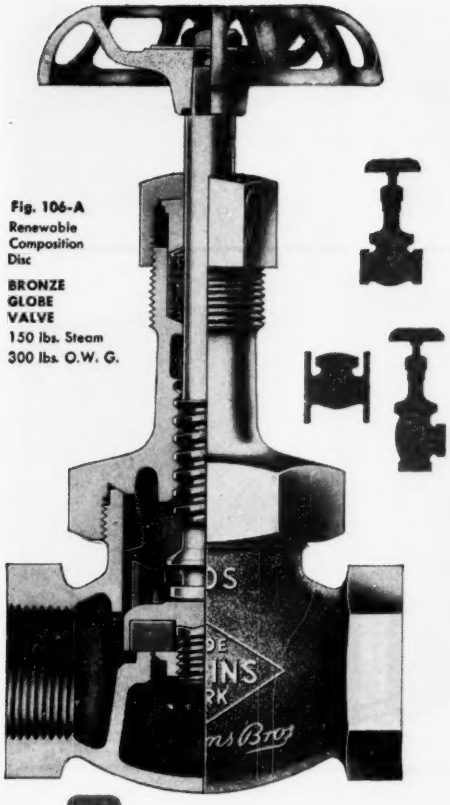
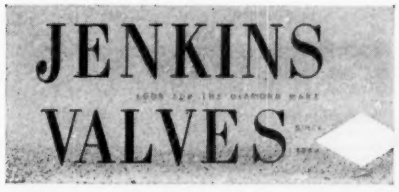


Fig. 106-A
Renewable Composition Disc

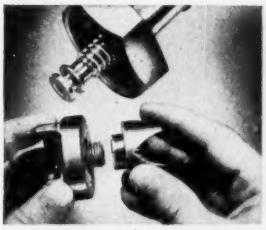
BRONZE GLOBE VALVE
150 lbs. Steam
300 lbs. O.W. G.



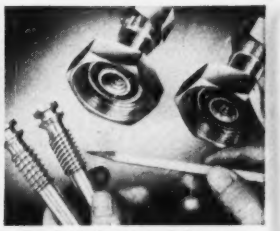
All these Valves . . from One!

Valve combinations for 90% of industrial piping assembled with 4 bodies and a handful of parts.

JENKINS FIG. 106-A "FAMILY"
Start with the standard Fig. 106-A. Trimming is interchangeable in Globe or Angle body, screwed or flanged.

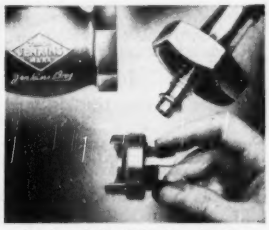


For Close Control — In throttling service, the nut which holds the disc in the disc holder is removed and replaced with Throttling Nut, Fig. 344.



For Quick Opening and Closing — Merely substitute the bonnet and spindle from Fig. 941, in which threads are pitched more sharply.

For Lift Check Service — Globe or Angle Bodies can be fitted with interchangeable Cap, Disc Holder, and Guide Disc Nut from Fig. 117A. Addition of spring from Fig. 655A provides spring loaded service.



For Stop & Check Service — Use the 106A trim, but substitute this spindle from Fig. 630A and replace the regular disc nut with the check valve guide disc nut.

Look over these pictures and see how easy it is to make up just the valve type you need, simply by interchanging parts. Think of the saving this means in maintenance expense . . . in reduced inventory of spare valves in your stockroom.

That's a big reason why the Fig. 106-A series takes top honors in any poll for valve preference. And Jenkins time-proved design, makes them the longest-lasting, lowest-upkeep valves that money can buy.

For example, see the heavy construction of the one-piece, screw-over bonnet. You can remove and replace it over and over again without distortion. See the extra size packing box,—and the perfectly machined threads on the heavy manganese bronze spindle, with more threads in contact with the bonnet, open or closed.

Remember, Jenkins Bros. is the originator of the renewable composition disc valve,—the *only* manufacturer of both valves *and* discs. For drop-tight, trouble-free performance, get acquainted with the Fig. 106-A "family". Despite their extra value, *you pay no more* for Jenkins Valves. Jenkins Bros., 100 Park Ave., New York 17, N. Y. Jenkins Bros., Ltd., Montreal. Sold through leading Industrial Distributors.

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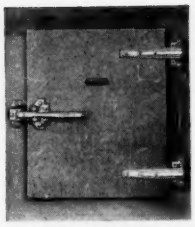
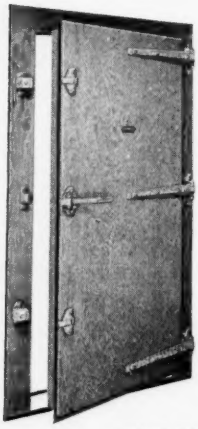
ALL STYLES NOW AVAILABLE



REACH-IN

VESTIBULE

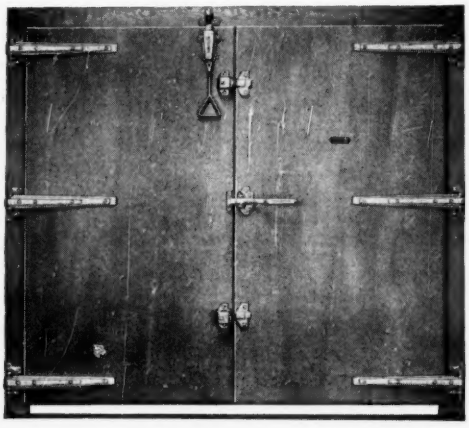
TRACK



WALK-IN

The quick acceptance of the Series "50" cold storage door with "Monopanel" construction now makes it possible to offer this door in all standard types.

People who use and specify cold storage doors have recognized the advantages of "Monopanel" construction with plastic bonded marine plywood for greater rigidity, smooth, sanitary surface and unbroken insulation. Other important features that contribute to the popularity of the Series "50" Door include the heavy duty, adjustable Jamison hardware—E-Z Open Two-Point Fasteners and Adjustoflex Hinges—the Lo-Temp Gasket, the "Sillseal" gasket, and "Vaporseal" vapor barrier.



DOUBLE

JAMISON

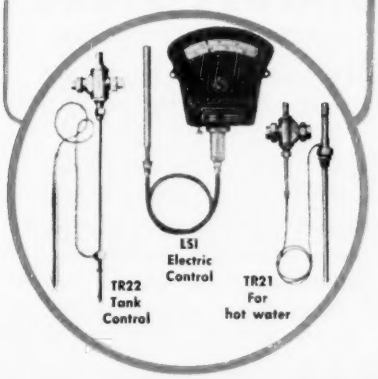
HAGERSTOWN, MARYLAND, U. S. A.

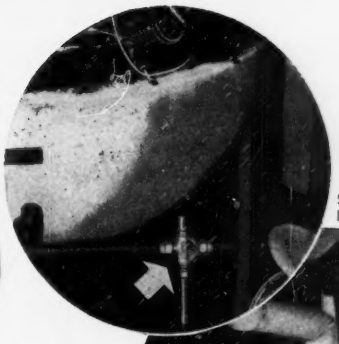
The leader for more than 50 years

Before you buy your next cold storage doors, be sure you have full information on the Series "50". Write for Catalog.

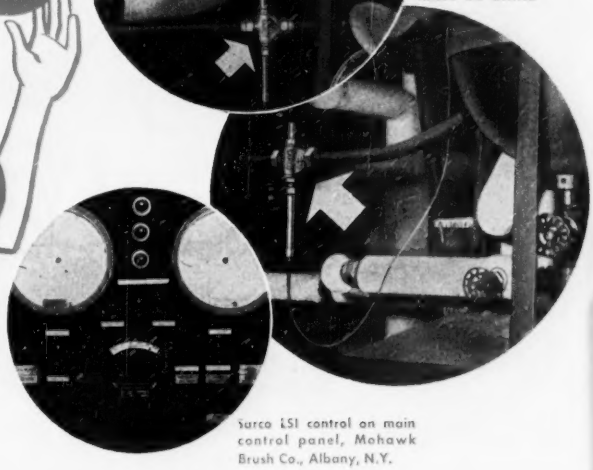
JAMISON COLD STORAGE DOOR CO. • HAGERSTOWN, MD. • U. S. A.

"BOSS, I'M NO JUGGLER, BUT I KNOW SARCO CAN DO THE TRICK"





Sarco TR22 Regulators on kettles



Sarco LSI control on main control panel, Mohawk Brush Co., Albany, N.Y.

The operator of this mixing process was just plain smart when he told his boss that he couldn't juggle the five different temperatures which must be exact at all times for successful production.

Sarco did the trick. Each of the ingredient kettles now has a Sarco TR22 regulator on the steam supply. Two tanks have a Sarco LSI electric indicating control, one of which is shown on the main control panel above, and the final mixing tank is held at exactly 212° with another Sarco.

The result is increased output because no time is lost, and repeat performance is insured. Of course, the combined operation uses less steam because none is wasted.

WHEREVER TEMPERATURES COUNT — The process engineer can be the boss. He can specify the temperatures he wants — and know that is how the job will operate. Furthermore, if he wishes to change the process it would take only a minute to reset the regulators.

A few of the Sarco controls used for batch operations are shown at the left. If you have a temperature control problem, try Sarco first.

311

SARCO SAVES STEAM

SARCO COMPANY, INC.

Represented in Principal Cities

Empire State Building, New York 1, N. Y.

SARCO CANADA, LTD., TORONTO 5, ONTARIO

IMPROVES PRODUCT QUALITY AND OUTPUT

have you heard?

of the amazing performance of MicroRold

extra light gauge stainless steel

During the current critical nickel shortage MicroRold's close tolerance light gauge sheets offer an excellent opportunity to secure more square feet of stainless steel per ton.

The outstanding uniformity of gauge, found in MicroRold is producing greater area per ton, longer die life and less rejects. Reduced finishing costs are permitted through its excellent surface qualities. Savings in purchase weight are made possible by ordering MicroRold to a decimal thickness with usual MicroRold tolerance of plus or minus 3%. Extra-light gauges are no longer limited to narrow widths — we are supplying sheets up to 36″ wide as light as .010 in thickness and sheets 30″ wide as light as .005.

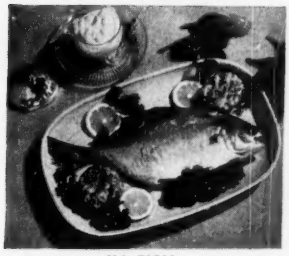
Why not make use of the exclusive advantages offered by MicroRold extra-light gauges?

WASHINGTON STEEL CORPORATION

Washington, Pennsylvania

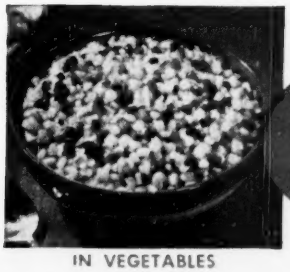
NOW! "Fresh Flavors" Can Be Locked In Processed Foods!

IN SOUPS



IN FISH

IN MEATS



IN VEGETABLES

ZEST
MONOSODIUM GLUTAMATE

Let Us Prove How ZEST Staley's Monosodium Glutamate Seals in Original Food Flavor!

Equally Effective Before or After Processing!

At last, there is a way to recapture that elusive *fresh flavor* which is often lost during food processing! Frozen, dehydrated, or canned . . . your finished product gets an amazing flavor boost with the addition of a small amount of ZEST! Prove to yourself in seconds how this 99+% Pure Monosodium Glutamate will improve the taste appeal of your foods.

No Formula Changes—No Trouble!

ZEST adds no color, taste, or aroma of its own—it simply magnifies the natural goodness in the foods in which it is used. As little as 0.05 to 0.5% by weight works miracles in canned soups, canned poultry, seasonings, sauces and most other foods. It requires no formula changes . . . it's as easy to use as salt.

Tiny Crystals Dissolve Instantly!

Try it with your own products . . . taste them the way they are now; then taste them with ZEST added! You'll notice the surprising difference immediately! Our food technicians and research staff are ready to give you specific recommendations on your products.

A. E. STALEY MFG. CO., Decatur, Illinois

Get Your Free Flavor Test Kit Now!

A. E. STALEY MFG. CO.
Dept. FG-11, Decatur, Ill.

Gentlemen:
Rush me your free test kit so I can prove to myself the profit miracle that ZEST Flavor-Improver can perform for my products.

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*City*_____ *State*_____

"HARVEST MOON"—AN ORIGINAL LITHOGRAPH BY HENRY E. WINZENREID

"When the Harvest Moon is Shining"*

The wheat fields at harvest time soon become baked goods, cereals, snack foods, flour mixes and countless other necessities in our abundant diet. In final packaged form, most of these foods rely on Riegel Papers for the careful preservation of their edible goodness.

There's a Riegel Paper for almost any requirement you may have in protective packaging . . . a paper you can depend on for economy and production efficiency. We feel sure we can serve you in the same effective manner we now serve the sales leaders in so many different fields. Write us today and tell us what you want. **Riegel Paper Corporation • 342 Madison Ave., N. Y. 17.**

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Riegel TAILOR-MADE PAPERS FOR PROTECTIVE PACKAGING

FOODS COST LESS
when delivered in Fruehauf Trailers!

This Trailer, with stainless steel exterior, was designed by Fruehauf engineers for the hauling of baked goods — another example of how the cost-cutting Trailer method can be "tailored" to the needs of practically any business having a transportation problem.
Dugan's
Since 1878
Dugan's

YES, in *all* kinds of hauling, more Trailer owners use Fruehaufs than any other make. That's because these owners know Fruehaufs haul the biggest loads, last longer, cost the least to operate.

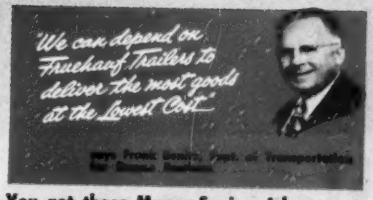
And in the case of operators who formerly used *only* trucks...they have discovered that they can greatly reduce hauling costs by switching to Trailers — *because Trailers more than triple the work a truck can do.*

The Fruehauf line is complete — there's a Trailer for every hauling need. Each one is built with money-saving features found in no other Trailer.

If you do not use Trailers—possibly they could materially cut your hauling costs. Would you like to know the facts? Write us on your business letterhead for a "Transportation Cost Analysis." This service is yours for the asking—without cost or obligation. It may show you how to make important savings — write for it today. The Fruehauf Trailer Company, Detroit 32...Los Angeles 11... in Canada: Weston, Ontario.

UP TO 5 YEARS TO PAY! Qualified operators can have up to 5 years to pay — the best evidence you could ask for that Fruehaufs do last longer. Ask about our "pay as you earn" financing plans.

Trucks pay their share—*and more*—for their use of our highways. Although trucks make up only about 18% of all motor vehicles in the country, they pay over 32% of all motor vehicle taxes.



You get these Money-Saving Advantages with STAINLESS STEEL TRAILERS . . .

FRUEHAUFS HAUL BIGGER PAYLOADS—**For comparable capacity, strength and durability, the new type Stainless Steel is the lightest Trailer on the road! Carries up to 4000 lbs. more payload than conventional units.**

FRUEHAUFS LAST LONGER—**There is no record of a Stainless Steel Trailer ever having worn out. All the basic structural members are built of lighter, stronger, longer-lasting Stainless Steel.**

FRUEHAUFS COST LESS TO OPERATE—**There is practically no upkeep cost on Stainless Steel. Never requires painting . . . resists corrosion . . . can't rust out. The first cost is virtually the last cost.**

FRUEHAUF *Trailers*

WORLD'S LARGEST BUILDERS OF TRUCK-TRAILERS

New OMEGA Belt-Type Gravimetric Feeder

- ★ **Small, compact unit (cabinet approx. 30" x 17" x 17")**
- ★ **Stainless steel cabinet and feeding mechanism**
- ★ **High accuracy**
- ★ **Rate of feed up to 3 cu. ft./min.**
- ★ **Non-flooding feeding mechanism**
- ★ **Universal application**

See this new feeder for dry materials on display for the first time at Booths 93-94 at the Power Show in Grand Central Palace, New York, Nov. 27-Dec. 2, or, for complete information and Bulletins, address Omega Machine Company (Division of Builders Iron Foundry), 402 Harris Ave., Providence 1, R. I.

THE LAST WORD IN FEEDERS

OMEGA

Yes—J&L quality controlled methods of manufacture are now being applied to the production of Steel Pails. You now can buy J&L Steel Pails in one-gallon to ten-gallon capacities . . . with interior coatings designed to ensure the safety and purity of your product.

Your products deserve the best—ship them in J&L Steel Pails . . . available with closures, spouts, finishes, lithography and printing to meet your specifications.

Why not write today for a free copy of our booklet: "It's Safer to Ship in Steel". It gives complete information on J&L Steel Pails—quality controlled from the mine to the finished container to guard the safety of your products in transit and in storage.

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Please send me a free copy of your booklet, "It's Safer to Ship in Steel."

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Company_____

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Well, counting fruit fresh from the tree,
For mixes, syrups, candies, cakes,
You'll take the cherry NORDA makes

Cherry flavor is very popular. Just how popular is it? Norda Cherry is likely to show you.

Norda Cherry Flavor can help make your cherry products the most popular products you sell.

Norda Cherry seems to have the extra *real cherry* taste of fresh-picked, plump, red fruit. There certainly is added flavoring power abundantly in Norda Cherry.

Norda Cherry is quality-made. Genuine and fine imitation are achievements of true flavor experts—skilled, long-trained to *know* flavors.

Send for *free samples* of Norda Cherry Flavor—give it all your tough tests. We think you, too, will find you prefer it. Send today.

Norda Cherry . . .
Another "Favorite to Flavor It"

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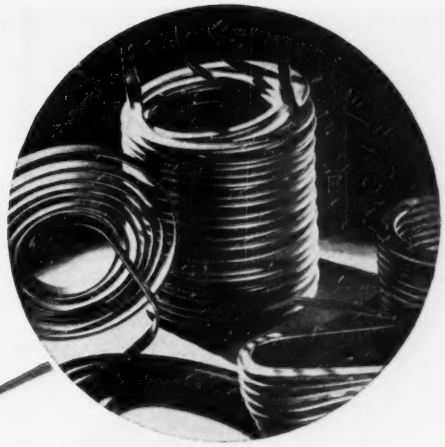

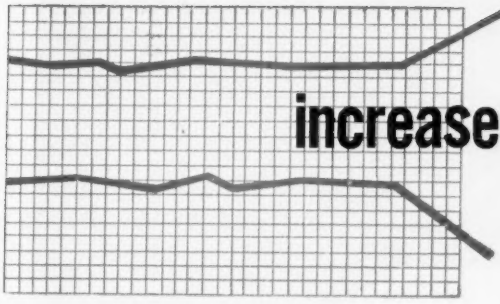

increased equipment service

reduced operating costs

with TRENTWELD beverage tubing

TRENTWELD features that meet your needs!

- Stays bright and clean, inside and out
- No possible taste effect
- No possible toxic effect
- Readily flattens, flares, flanges, coils
- Available in sizes for your application
- Neatly packed for your convenience

More and more manufacturers and users of brewery equipment are finding that modernization with TRENTWELD Stainless Steel Beverage Tubing is a direct means for cutting costs and keeping production lines running smoothly. TRENTWELD in tap rods, cooling coils, beer lines . . . is daily performing exceptional service in hundreds of brewery applications.

TRENTWELD Beverage Tubing is made in a *tube* mill by *tube* engineers who roll and weld stainless and high alloy tubing *exclusively*. That means you're assured quality tubing to meet your strictest requirements. And you get delivery on time because of Trent's convenient mid-continent location.

Then too, alert Trent metallurgists are freely available to you to help you put TRENTWELD to work in your brewery application. Start cutting your operating costs by calling in Trent. Write for your copy of the TRENTWELD DATA BULLETIN.

TRENTWELD

TRENT TUBE COMPANY
Subsidiary of Crucible Steel Company of America
General sales office and plant — East Troy, Wisconsin
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STAINLESS STEEL BEVERAGE TUBING

SANDVIK STEEL BAKE OVEN BAND IN OPERATION ON BAKER-PERKINS OVEN UNIT AT FARM CREST BAKERIES, INC., COLUMBUS, OHIO.

ANOTHER EXAMPLE OF WHAT SANDVIK IS DOING IN THE FOOD INDUSTRY

COOKIES RIDE "HOT, WIDE AND HANDSOME" ON THIS SANDVIK STEEL BAKE-OVEN BAND

The Farm Crest cookies riding through a Baker-Perkins oven on this Sandvik Steel conveying band benefit from three Sandvik features.

1. They ride "HOT"—
The heat-absorbing dark finish of the Sandvik band helps promote thorough baking.

2. They ride "WIDE"—
They are carried on a 38" wide Sandvik band.

3. They ride "HANDSOME"—
The Sandvik band resists heat-distortion. Specially adapted for smooth operation.

Sandvik has pioneered in supplying steel bake-oven bands to the baking industry. Today, Sandvik bands are in use in many of the leading bakeries in America.

Have you considered how a conveyor with a solid steel-belt could improve your food handling operation?

In addition to bake-oven bands, Sandvik supplies complete steel-belt conveyors for handling a wide variety of foods.

These conveyors are available with carbon or stainless steel belts. They are easy to keep sanitary. The smooth, impermeable surface of the belt provides no place for minute food particles to lodge. A simple scraper blade can be used to remove sticky material.

Ask Sandvik for complete information and engineering advice.

SANDVIK STEEL, INC.

Conveyor Department
111 Eighth Ave., New York 11, N.Y.
WAtkins 9-7180

Manufacturers of Steel-Belt Conveyors For Over 30 Years

SANDVIK STEEL BELT CONVEYORS

55-65

Serving Industry... which Serves Mankind

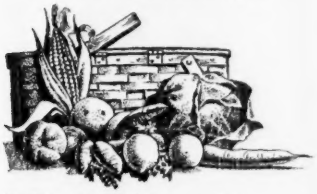
MONSANTO CHEMICALS PLASTICS

MANY INDUSTRIES PROFIT MANY WAYS

Chemistry is an expanding source of profit to all industries. More and more manufacturers rely on Monsanto's more than 400 chemicals and plastics—use them in many phases of their over-all operations to improve products, lower production costs, increase sales. Investigate the possibilities in your business.

COME AND GET IT

Nobody turns a deaf ear to a dinner bell. Everybody knows it means food. But—not everybody realizes how much the food industry does to make America's dinner bell mean that this country is the best-fed and best-nourished in the world . . . To this accomplishment in food, Monsanto chemicals contribute much. Their use by the food industry covers a wide scope—insures better harvests, greater beef and dairy yields, improved processing, higher sanitation, lowered costs, increased sales appeal.

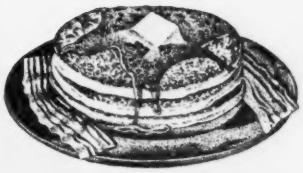


fruits, vegetables, grains

One of the most potent Monsanto insecticidal chemicals for increasing wheat, apple and citrus fruit yields is Niran*—Monsanto's parathion. It is very toxic; must be formulated, handled and applied with great care . . . Nifos*-T, another Monsanto insecticidal chemical, is used in formulations for the effective control of aphids and mites that attack vegetables and fruits. It is very powerful in weak solutions—has negligible residual toxicity . . . Santobane*—Monsanto's DDT—is widely used in formulations to stop corn borers . . . Larger crop yields result from applications of 2,4-D formulations to weedy grain fields.

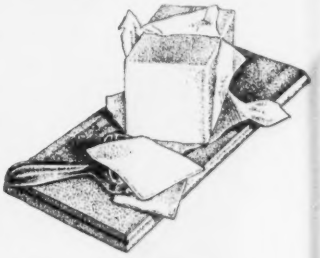
ice cream, cake, confections

Many foods derive much of their tempting taste from Monsanto products. Fluffier, lighter cakes result when cake flours contain Monsanto phosphates. The richer flavors of icing and ice cream are contributed by Ethavan*—Monsanto's vanilla-like flavoring principle used by extract manufacturers. Vanillin is another Monsanto flavor principle. So is methyl salicylate, with its wintergreen flavor.



pancakes, doughnuts, muffins

Uniformity in prepared flour mixes is assured by the use of Monsanto acid leavening phosphates. Pancakes, for instance, are always tender and crisp—the last batch is just like the first. Self-rising flours are also improved by the use of Monsanto phosphates—they contribute nourishment in addition to better baking properties. Phosphoric acid is still another Monsanto food-use product.



cheese, dairy products

Cheese processors use Monsanto phosphates as emulsifiers . . . Another Monsanto product, used by formulators of dairy cleaning compounds, is Santomerse* No. 1. It is a detergent with powerful cleaning and free-rinsing action; promotes sanitation.

more information

Manufacturers of foods and food products are invited to contact Monsanto for more information on products that will help them in any phase of their operations. Check and return the coupon, or write Monsanto Chemical Company, 1737L South Second Street, St. Louis 4, Missouri. In Canada: Monsanto (Canada) Limited, Montreal and Vancouver.

*Reg. U. S. Pat. Off.

MONSANTO
CHEMICALS — PLASTICS

Serving Industry...Which Serves Mankind

SPECIAL TO THE FOOD INDUSTRY

If you are interested in any phase of food production, processing or sales, you are invited to check any of the following products on which you would like added information:

☐ Niran for insecticidal formulations . . . ☐ Nifos-T for insecticidal formulations . . . ☐ Santobane for corn-borer control formulations . . . ☐ 2,4-D for weed-control formulations . . . ☐ Ethavan . . . ☐ Vanillin . . . ☐ Phosphate products for the food industry . . . ☐ Santomerse No. 1 for compounding detergents.

MONSANTO CHEMICAL COMPANY
1737L South Second Street, St. Louis 4, Missouri

Please send information on products checked at the left for use in _____

Name _____ Title _____

Company _____

Address _____

City _____ State _____

STURTEVANT DUSTLESS BLENDERS

Thoroughly Blend Substances into an Inseparable Mass

The 4-Way Mixing Action of the Sturtevant Dustless Blenders thoroughly mixes two or more substances into an inseparable whole . . . every part of which is the same analysis. Single receiving and discharging opening insures tight sealing during mixing process. "Open-door" accessibility permits thorough cleaning. The fast, accurate mixing operation increases output . . . cuts mixing costs. Available in many sizes with mixing capacities from ¼ ton to 75 tons per hour. Write for information and catalog.

Receiving — The ingredients to be mixed enter the mixing chamber of drums through a chute. Note scoops which carry up and dump the ingredients as drum rotates assuring a more uniform mix.

Discharging — Throwing a lever closes the inlet and mixer is in discharging position. The completely mixed materials drop off the lifting scoops and discharge through chute without segregation of ingredients.

The Sturtevant Mill Company

106-A Clayton Street, Boston 22, Massachusetts

Designers and Manufacturers of: CRUSHERS • GRINDERS • SEPARATORS • CONVEYORS • MECHANICAL DENS and EXCAVATORS • ELEVATORS • MIXERS

Sterwin
serves the
ENTIRE FOOD INDUSTRY

Sterwin helps every branch of the Food Industry to provide tastier, more nutritious and more attractive food products for America's housewives.

Leading food processors depend on these tested and proven Sterwin products to insure the purity, uniformity, taste, appearance and nutritional value of their products.

ZIMCO® — Brand of Pure Lignin Vanillin—used by leading flavor suppliers and by the confectionery, ice cream, bakery, soft drink and other branches of the Food Industry.

PARAKEET — Brand of Certified Food Colors —adds eye and sales appeal to all types of food products.

B-E-T-S® — The *Original* Food-Enrichment tablets—add important vitamins and food iron to bread, macaroni and other cereal food products.

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ASCORBIC ACID (Vitamin C)—Fortifies fruit juices, vegetables, dairy products, beverages and confections. Protects flavor and color of frozen fish and fruit.

TRIDEE® (brand of vitamin D_3) and **RIBOFLAVIN MIXTURE**—Fortify poultry feeds—increase egg production.

SANITIZE YOUR PLANT — with ROCCAL®—The *Original* Quaternary Ammonium Germicide. A powerful germ-killer—can be used for every equipment sanitizing job throughout the Food Industry.

U. S. P. VITAMINS AND AMINO ACIDS IN BULK

There is a Sterwin Technically-Trained Representative in your area. Let him show you how you can put Sterwin products, service and research to work in your plant. Or write direct to Sterwin Chemicals Inc., 170 Varick St., New York 13, N. Y.

BRANCH OFFICES: Atlanta, Boston, Buffalo, Chicago, Dallas, Kansas City (Mo.), Los Angeles, Minneapolis, Portland (Ore.), St. Louis.

Sterwin Chemicals INC.

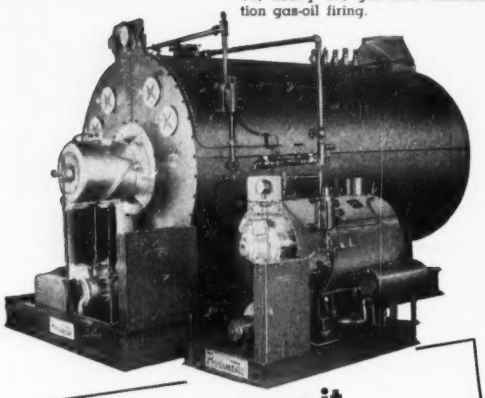
Subsidiary of Sterling Drug Inc.

1450 BROADWAY, NEW YORK 18, N. Y.

Distributors of the products formerly sold by Special Materials Industrial division of Winthrop-Stearns Inc., and Vanillin Division of General Drug Company.

15 HP. to 500 HP. -any size Powermaster gives you low-cost steam!

Available in pressures from 15 to 200 p.s.i.—15 to 500 HP.—for light oil, heavy oil, gas and combination gas-oil firing.



Here's how it cuts your operating costs:

- √ Low fuel consumption through high efficiency
- √ Low-cost installation due to packaged design
- √ Reduced man-hours through automatic operation
- √ Mounted on steel base; no bricking required
- √ Delivered fully wired and factory-tested
- √ A.S.M.E. constructed; Underwriters' approved
- √ Prompt service by factory-trained men

Latest catalog mailed promptly—send coupon

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Established 1885

Powermaster® STEAM GENERATORS

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940 Morgantown Rd., Reading, Pa.

Please mail latest catalog showing Powermaster's cost-cutting advantages.

Name_____

Company_____

Address_____

ah! what delicious flavor

You'll agree, your customers will agree, it's the FLAVOR that makes the meal.

D&O has the Perfect Flavor and the correct flavoring materials to serve your every specific flavor requirement starting from shrimp cocktail sauce, to soup, to gravy... including powdered dessert and cake frosting.

SPICEOLATES,

the water-soluble spice flavors made by D&O from pure natural oils and oleo resins offer greater economy and completely uniform flavor quality. Spiceolates are pure products in every respect.

Additional information concerning the use of Spiceolates on request.

For better flavors . . . consult D&O.

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For Lawry's Products, Inc....

PERVENAC* LABELING

Gives Both!

Speedier, Neater "Stay-Put" Labeling Here!

Add Lawry's, Los Angeles, Calif., to the many merchandising-minded packers who know a good thing when they see it — *demonstrated!* Pervenac cuts costs by turning non-productive glue preparation and cleanup into hours required for productive labeling. What's more, Pervenac labels applied to wet (or dry) glass *really stick — permanently!* Photo shows application by a New Jersey Machine Company Pony Label-DR1 machine.

Eye and Buy-Appeal that Builds Sales Here!

To sell the impulse shopper a quality bottle must have a quality label — a label that's *always* smear-free, curl-free, wrinkle-free, and tear-free at the edges. If your brand is better than the next fellow's, let your label "say so" in self service! Whether you pack in glass, film, metal, foil or paper, there's a Pervenac label that will give you better *adherence* and *appearance*. Write Nashua direct or contact your Pervenac distributor.

*Trade Mark
Manufactured under patent 2,462,029

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MAKES PAPER MAKE MONEY FOR YOU

NASHUA GUMMED AND COATED PAPER COMPANY
NASHUA, NEW HAMPSHIRE

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American Paper Exports, Inc.
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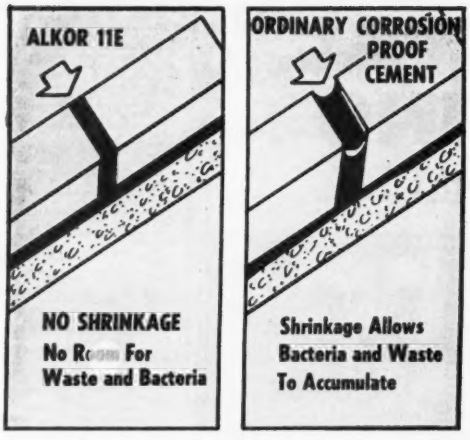
UNITED KINGDOM, EUROPE, NO. AFRICA and the NEAR EAST
I. J. Szper, 65 Ave. Niel, Paris

GREAT NEWS! Atlas research announces



A COMPLETE LINE OF CORROSION-PROOF CONSTRUCTION MATERIALS

ALKOR 11E

the superior acid and alkali proof cement for brick and tile floors

This is the news you have waited for, ALKOR 11E, the nearest thing to a universal corrosion-resistant cement. Check these properties: Inert to all solvents and alkalies; Resistant to all non-oxidizing acids; No appreciable shrinkage on setting; No obnoxious odors; Excellent workability; Easily tooled; Adhesion to wire cut brick greater than 500 psi; Tensile strength 1500 psi; Compressive strength 15,000 psi; Heat accelerates setting only, no fumes or smoke; Sets in less than 24 hrs. at 70° F. For complete information write us at 12 Walnut Street, Mertztown, Penna.

ATLAS HAS PROTECTED INDUSTRY
OVER HALF A CENTURY

THE ATLAS MINERAL PRODUCTS COMPANY
MERTZTOWN, PENNA. HOUSTON, TEXAS

PUT WHEAT TO WORK FOR YOU

Wheat—plump, golden kernels—is one of man's oldest, most reliable friends. Put it to work in your food processing plant by using General Mills Paygel *wheat* starch!

Right now, Paygel is doing a remarkable job as a fat (emulsion) stabilizer during critical production phases of specialty canned foods such as canned chili, soups, etc.

This amazing wheat starch actually *costs less* than imported root starches and provides a dependable domestic supply. Yet gives you *superior* products with less trouble. Chemically modified and highly purified, Paygel is produced by General Mills under rigid product and laboratory controls. Paygel is *thick-boiling* starch with excellent absorption, yield. Produces outstanding sols and gels lacking cereal taste and odor.

For gum candies, General Mills offers another fine wheat starch:

B-2455—highly purified and modified, this starch is *thin-boiling.*

Free samples of Paygel and B-2455 starches are yours for the asking. Find out how these *wheat* starches can pay off for you in better products, lower costs—increased profits. Write or wire—

General Mills, Inc.

Special Commodities Division

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208 So. LaSalle St.
Chicago 4, Ill.

Room 2701, 80 Broad St.
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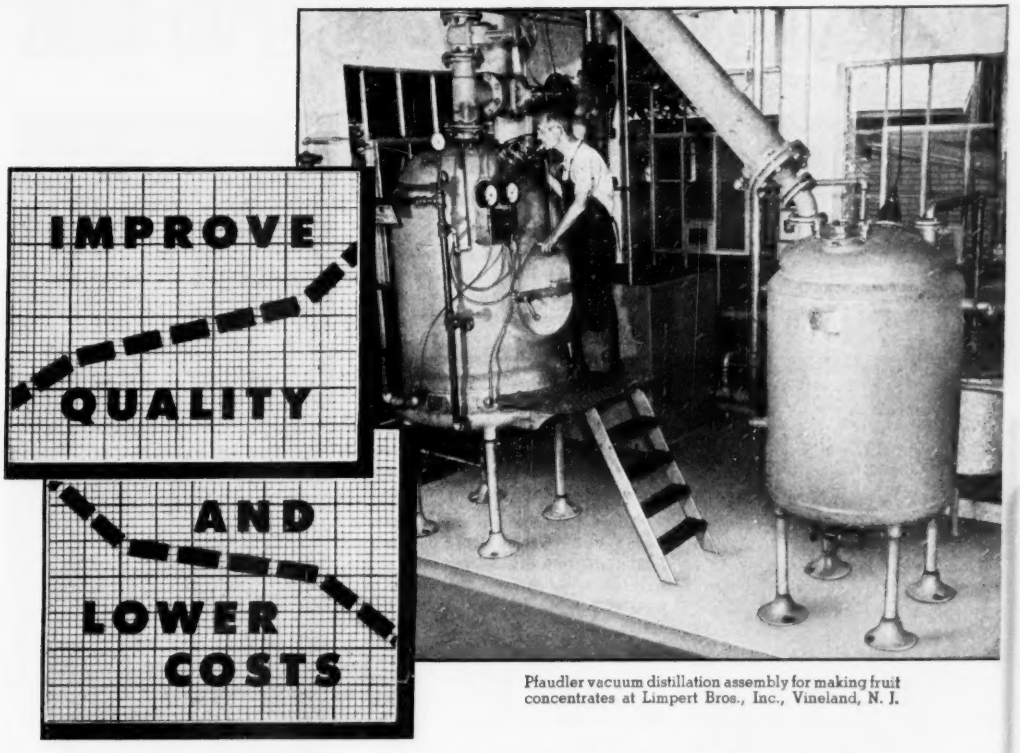

Pfaudler vacuum distillation assembly for making fruit concentrates at Limpert Bros., Inc., Vineland, N. J.

by accurately controlling the process!

Accurate control of the process is the key to better food products at lower cost. Here is a typical example—a vacuum distillation process for making fruit concentrates at Limpert Bros., Inc., Vineland, N. J.

Water is quickly removed by means of low temperature, high speed evaporation. Products are uniform in quality, heavy in body, natural in color and flavor. They retain all important natural characteristics. They sell better.

By saving time, by eliminating product losses through carmelization, off flavor, or loss of color, costs have been reduced.

Pfaudler engineers can help *you* obtain better products at lower costs by designing and building equipment that gives you accurate control throughout the process. That's the trend in food engineering. Are you prepared? Write today!

THE PFAUDLER CO., Rochester 3, N. Y. Branch offices: 330 W. 42nd St., N. Y. 18, N. Y.; 111 W. Washington St., Chicago 2, Ill.; 818 Olive St., St. Louis 1, Mo.; 2970 West Grand Blvd., Detroit 2, Mich.; 1719 1st Nat'l Bank Bldg., Cincinnati 2, Ohio; 1041 Commercial Trust Bldg., Philadelphia 2, Pa.; 751 Little Bldg., Boston 16, Mass.; 334 Chattanooga Bank Bldg., Chattanooga, Tenn.; P. O. Box 4066, Dallas, Texas; Taylor St., Elyria, Ohio; 1346 Connecticut Ave., N. W., Washington 6, D. C.; 121 Bauman Ave., Pittsburgh 27, Pa.; P. O. Box 1031, Minneapolis, Minn.; The Pfaudler Sales Co., 1325 Howard St., San Francisco 3, Calif., 3757 Wilshire Blvd., Los Angeles 5, Calif.; Enamelled Metal Products Corp., Ltd., Artillery House, Artillery Row, London, S. W. 1, England.

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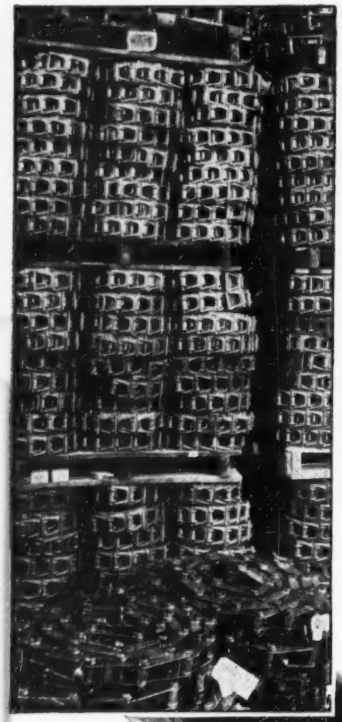
THE PFAUDLER CO., ROCHESTER 3, NEW YORK

ENGINEERS AND FABRICATORS OF FOOD PROCESSING EQUIPMENT

Glass-Lined Steel . . . Stainless Steels . . . Nickel . . . Inconel . . . Monel Metal

CHAINS *from* STOCK



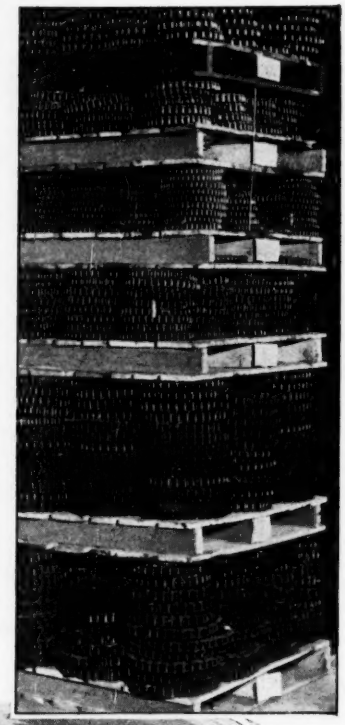
Popular types and sizes available at once from Columbus—from our distributors in all industrial centers

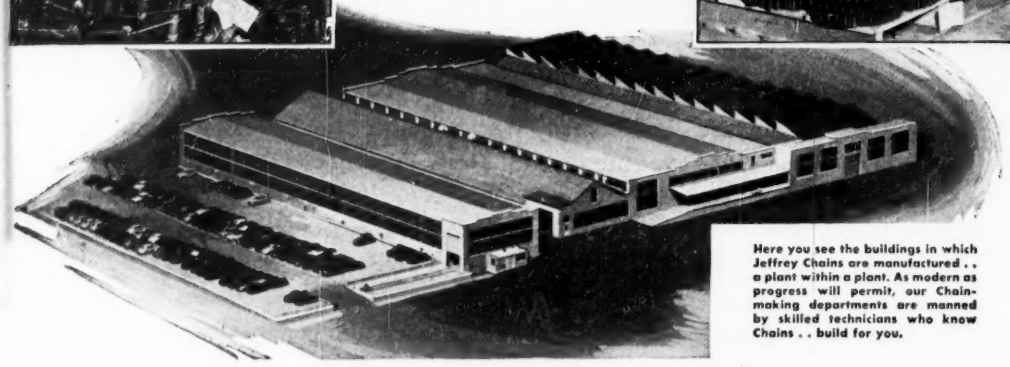
NEED CHAINS? We can ship immediately from our large stock here at home or you can contact any one of our authorized Stock-carrying Distributors, strategically located throughout the United States to better serve your needs.

Our recently-enlarged Chain-making establishment (see photo below) is fully equipped with new high-speed tools . . every modern facility to make chains scientifically better . . faster.

A large assortment of Sprockets, Gears, Pulleys, Babbitted Bearings and other Transmission items are also available for prompt shipment, as well as a line of Spiral Flights, Belt Idlers, etc.

We will be glad to take care of your requirements . . will handle those "Ship At Once" requests promptly. May we hear from you?





Here you see the buildings in which Jeffrey Chains are manufactured . . a plant within a plant. As modern as progress will permit, our Chain-making departments are manned by skilled technicians who know Chains . . build for you.

THE JEFFREY MANUFACTURING COMPANY

Established 1877

927 North Fourth St., Columbus 16, Ohio

Complete Line of Material Handling, Processing and Mining Equipment

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The Ohio Malleable Iron Co., Columbus, Ohio

British Jeffrey-Diamond Ltd., Wakefield, England
The Galion Iron Works & Mfg. Co., Galion, Ohio
The Kilbourne & Jacobs Mfg. Co., Columbus, Ohio

Today!... see the Golden Anniversary Macks!

Big-Mack Performance in Smaller Trucks

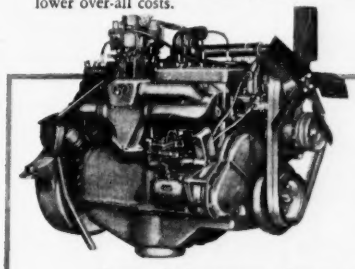
Mack Model A-20 (17,000 lbs. g.v.w.) offers all of Mack's famed low-cost operation to truckers who need an economical small truck with Big-Mack dependability.

Yes, here's a cost-cutting advantage you've been waiting for—Big-Mack quality in popular-size trucks. You get it now with Mack's new *Golden Anniversary* "A" Series trucks...built in the same high-quality tradition as their famous forebears... ready to handle their jobs with all the economy, reliability and longer life which has marked Mack performance for half a century.

Here's truly modern power—the sensational new *Magnadyne* engine—completely Mack-built in Mack factories—a worthy running mate for Mack's famed *Thermodyne* engine, renowned among truckmen, the country over.

Little job or big job—whether you need one truck or a fleet—you can depend on a Mack to work longer, at lower cost and with *less absenteeism.* Let your nearest Mack branch or distributor show you how these new Macks will save money on your job—day in and day out, year after year.

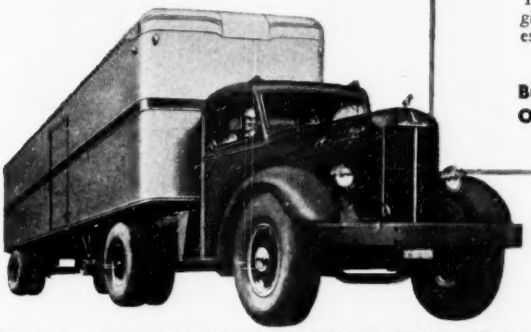
Mack Model A-30 (21,000 lbs. g.v.w.) pays off in sustained earning power, dependable performance on the job. Cheaper in the end because it lasts longer; boosts profits through lower over-all costs.



NEW MACK-BUILT MAGNADYNE ENGINE

Greater fuel economy...longer engine life...lower maintenance costs...sustained high performance. You get them all in the great new *Magnadyne* engine—a powerplant designed and built by Mack especially for modern hauling needs.

Mack Model A-40 (24,000 lbs. g.v.w. to 40,000 g.c.w.) covers a wide utility range as truck or tractor—four or six-wheeler.



Built like a Mack... Outlasts them all

Mack TRUCKS

8679

Mack Trucks, Inc., Empire State Building, New York 1, New York. Factories at Allentown, Pa.; Plainfield, N. J.; Long Island City, N. Y. Factory branches and distributors in all principal cities for service and parts. In Canada: Mack Trucks of Canada, Ltd.

Modernize with Mack!

IMPROVE your products

with the new "Unique" Krim-ko COLLOID Agents!

Krim-Ko's newest developments in sea-plant derivatives should be checked by all chemists who are interested in improving and controlling their products. Remarkably good results have been achieved in the application of these improved colloid agents in the food, pharmaceutical, cosmetic and industrial fields. They have proven an effective solution to a wide range of gelling, thickening, suspending and stabilizing problems.

Definite KRIM-KO Advantages

1 Dependable Uniformity
Krim-Ko's controlled processes plus Krim-Ko's unique and dependable sources of raw materials make possible a complete assurance of continuous, reliable uniformity. When you utilize Krim-Ko Colloids you know that year after year you will always get an agent of the same characteristics—thus aiding you in maintaining uniformity in your own products.

2 Custom-made to Fit Your Needs
The range and variety of Krim-Ko Colloids is so wide—and the manufacturing processes are controlled so accurately—that Krim-Ko can assure you colloid agents that meet your own particular requirements exactly! Actually—Krim-Ko Colloids are custom-made to your specifications.

3 Dependable Source of Supply
Regardless of world conditions—and possible future restrictions on supplies and imports—KRIM-KO offers you a U. S. source of supply upon which you can always rely.

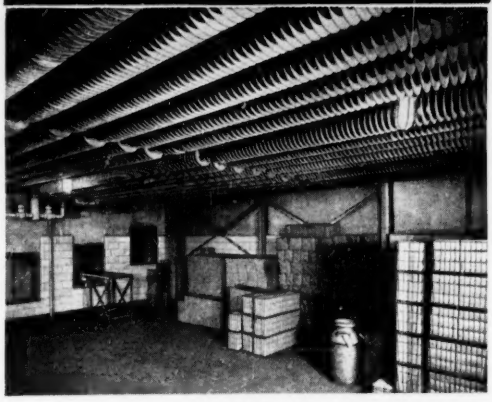
4 Tested, Approved and Used by Many Leading Companies
Many of this country's leading manufacturers and processors are successfully using KRIM-KO Colloids. Krim-Ko's Colloids have met the most severe competitive tests—and won acceptance on the basis of proven advantages.

5 Laboratory Service Available — Without Cost or Obligation
Krim-Ko maintains a complete well-staffed laboratory devoted exclusively to the solution of problems in this field. Here continuous research on colloid agents is carried on — assuring you access to the latest developments. If you have a problem involving emulsifying, thickening, suspending or stabilizing—send it on to us. Our laboratory will make their recommendations in confidence—without obligation or cost. Or if you prefer—we will send you working samples for your own laboratory. Write today.

KRIM-KO Corporation
SEAPLANT PRODUCTS DIVISION
NEW BEDFORD, MASS.

NEW HOWE POLAR CIRCLE COILS

Sensational 6-way Savings!



"The most remarkable low temperature coils I ever used," writes Mr. A. of Alabama.

YOU SAVE: PRICE • SPACE • LABOR • WEIGHT REFRIGERANT • FREIGHT

Revolutionary when first offered, now even improved. The greatest advance in years in refrigeration efficiency, economy! Ideal for quick freeze, freezer storage, meat packers, cold storage plants, ice plants, ice cream plants. Howe Polar Circle Coils provide *better* refrigeration, assuring *better* product control. Scientifically designed out of Howe's 38 years of refrigeration specialization. Sturdily built for heavy duty. For normal temperature coolers, use air flow type drip pan. Savings and performance job-proved!

IMMEDIATE DELIVERY—WRITE FOR DETAILS

FOR ALL REFRIGERATION PROBLEMS consult Howe, since 1912 manufacturers of ammonia compressors, condensers, coolers, fin coils, locker freezing units, air conditioning (cooling) equipment.

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Available: A few territories for new Distributors. Your inquiry will receive our prompt answer.

WHAT THE CHARMS CANDY COMPANY SAYS ABOUT *LIQUID SUGAR*

In the production of our candies, we found it necessary to use a specific type of liquid sugar. We turned the problem over to Flo-Sweet technicians who developed the sugar we needed and who have supplied us with this special sugar ever since. This is just one instance of the dependable service and cooperation we have received from Flo-Sweet.

(Signed) V. R. CICCONE,
Assistant Works Manager
The Charms Company

WHEN YOU USE FLO-SWEET® YOU GET SERVICE

Ask any Flo-Sweet customer—ask *every* Flo-Sweet customer—they'll all tell you, "Refined Syrups & Sugars have *never* let me down!"

That kind of service means you have no plant shutdowns, no lost orders, no disappointed customers.

That kind of service gives you better planning, greater economy, more repeat orders and larger profits.

HERE'S WHY FLO-SWEET MEANS SERVICE

1. Refined Syrups & Sugars is the largest liquid sugar manufacturer in the country—
2. has the industry's most complete production and storage facilities for liquid sugar—
3. maintains the largest number of tank-trucks, tank-cars, and tank-ships in liquid sugar service—
4. is the only refiner in the East maintaining liquid sugar warehouse and storage facilities away from our refinery for customer service.
5. Flo-Sweet production facilities are flexible to take care of the unusual in sugar requirements.
6. Flo-Sweet provides emergency delivery service.

flo-sweet

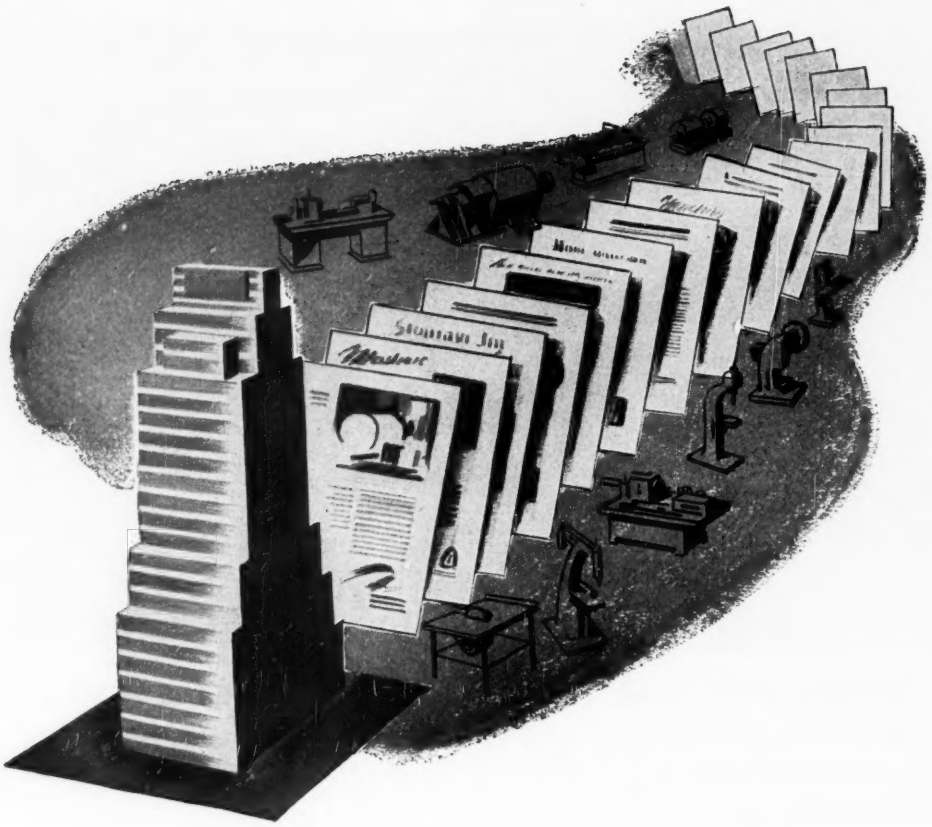
For dollar-saving, product-sanitation and *always-reliable service*, you can't beat Flo-Sweet Liquid Sugars!

Manufactured only by

REFINED SYRUPS & SUGARS, INC.

Yonkers 1, New York

PIONEERS IN LIQUID SUGAR FOR SAVINGS, SANITATION AND SERVICE



The Parade that has no End

As you go through the pages of this magazine . . . or of any other McGraw-Hill publication . . . a colorful parade of advertising pages unfolds before your eyes.

If you are like thousands of other readers of these magazines, you'll become an avid spectator of this interesting educational show. You'll take in the *whole* of this passing parade.

Why? Because this parade is a non-stop exhibition of all that's new in industry—new developments in products and services, new ways for the buyer to make use of these products, news which can often mean the difference between profit and loss to you.

That's why readers of McGraw-Hill magazines are cover-to-cover readers. That's why they're *regular* readers . . . *serious* readers. That's why men say: FOR THE FACTS OF *INDUSTRIAL* LIFE, TURN TO McGRAW-HILL.

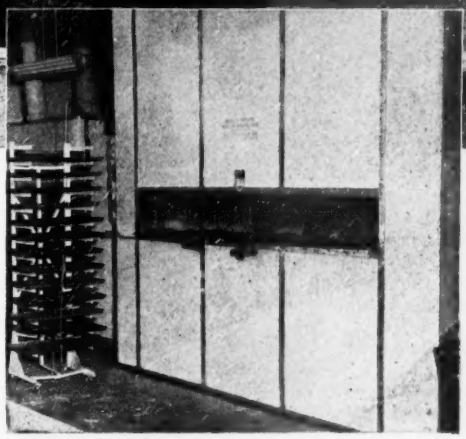
McGRAW-HILL

Publishing Company, Inc., 330 West 42nd Street, New York 18, N. Y.

HEADQUARTERS FOR INDUSTRIAL INFORMATION

Three Girls Bakery, San Fernando, California

THREE GIRLS BAKERY cooks with *GAS* to make "*the best you ever tasted!*"*



Foreground: 40 pan Gas-fired Middleby-Marshall revolving oven, with top capacity of 10,000 bread loaves a day. The Gas-operated 12 pan Dalton oven in the background bakes pastries, cookies, etc.

HOME QUALITY IN QUANTITY PRODUCTION is the exacting requirement demanded of Three Girls Bakery by owner G. W. Fredericks of San Fernando, California.

Housed in a new building, the bakery plant is designed to supply 20 to 25 retail outlets. To assure consistent uniformity of bakery goods, Three Girls Bakery is equipped with two Gas-fired revolving ovens, the 40 pan Middleby-Marshall, and the 12 pan Dalton.

A Gas-fired boiler provides steam, which is used to cook all fillings. The large amounts of steam needed for bakery clean-up are also produced by the boiler.

The efficiency of Gas—baking heat when you want it; the controllability of Gas—baking temperature where you want it, the economy and cleanliness of GAS all work for you to keep baking costs at a minimum.

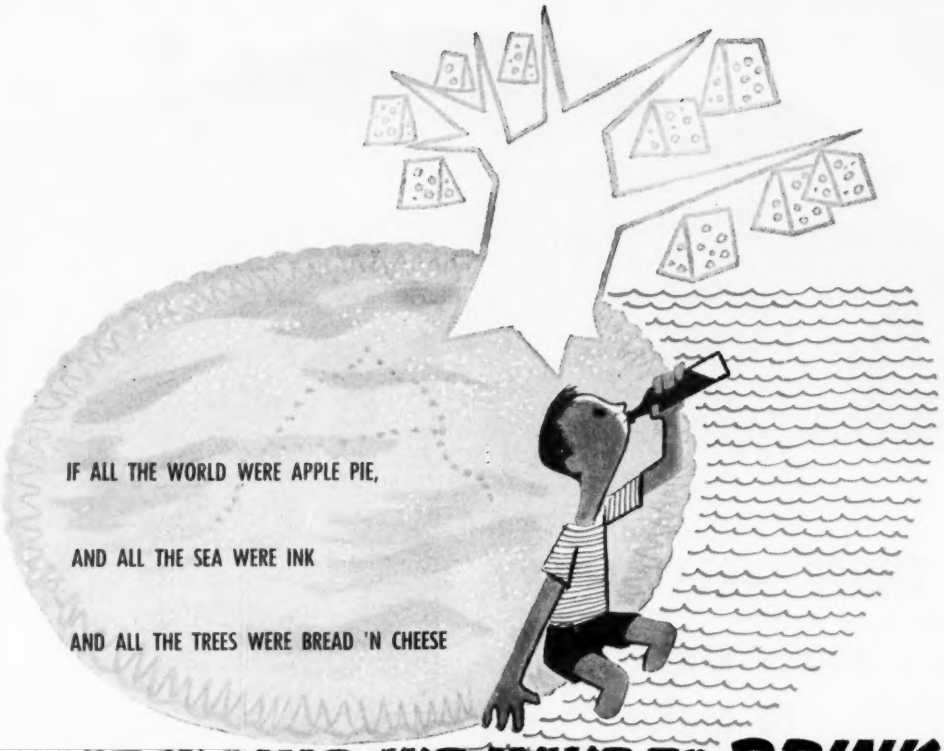
Your Gas Company Representative knows the answers—call him today. Let him put GAS to work for you.

Slogan of Three Girls Bakery

MORE AND MORE... THE TREND IS TO GAS

AMERICAN GAS ASSOCIATION

420 LEXINGTON AVENUE
NEW YORK 17, NEW YORK



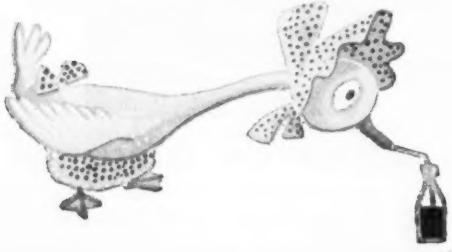
WHAT WOULD WE HAVE TO DRINK?

SODA POP, OF COURSE! . . . or maybe orange or sarsaparilla, or perhaps sparkling carbonated H_2O. In country stores, in big-league ball parks — Americans, young and old, are buying more soft drinks than ever before.

SOFT DRINKS . . . . . by the bottle it's only small change, but in total a BILLION-DOLLAR BUSINESS, growing so fast that production doubled within a decade. Yet soft drinks is only one of the processing groups that make up the $33 BILLION FOOD PROCESSING INDUSTRY.

Food Processing, a composite manufacturing group, is one huge industry . . . united by fundamental problems and essentially the same production principles. Its wide-awake branches are continually trading ideas for equipment applications, new materials and improved processes . . . and FOOD INDUSTRIES reports these new developments to the key men in the industry.

FOOD INDUSTRIES is read by top management, production and technical men who are alert for new methods of improving their own plants and products. These are the Food men who buy . . . and you can reach them directly and effectively when you tell your selling story in FOOD INDUSTRIES.



Food Industries

A McGRAW-HILL PUBLICATION

WISSCO BELTS

for dependable performance— from freezing to scalding

In diversified food processing applications—carrying meats, sea food, quick frozen foods, baked goods, ice cream, canned and pre-packaged fruits and vegetables—Wissco Metal Processing Belts have won outstanding preference because of proved advantages.

Wissco Belts operate with equal efficiency at freezing or scalding temperatures. Easy to clean because of open mesh construction, they also provide free drainage for blanching, scalding, washing, cooking, frying and numerous other types of processing.

Write for Catalog MS-600 describing the adaptability and cost-cutting advantages of Wissco Belts.

WISSCO METAL PROCESSING BELTS CF&I

A PRODUCT OF WICKWIRE SPENCER STEEL DIVISION OF THE COLORADO FUEL & IRON CORPORATION

Sales Office and Plant—56 Sterling Street, Clinton, Massachusetts
Executive Office—500 Fifth Avenue, New York 18, New York
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mrm LIQUID FILLING MACHINES

Simple design for low cost maintenance! Precision engineered for high efficiency!

MODEL GR

GRAVITY FILLERS

5 to 12 Spouts

- For all types of foamy and still liquids.
- Spouts have no packing, eliminating danger of contamination.
- Minimum overflow and absolutely drip-proof.
- No pump — no motor — minimum number of moving parts.
- Fills all containers from fractional ounce to 2 gallons.
- Quickly adjustable for various size and shape containers.
- Furnished with distribution header.
- Production from 50 to 80 fractional ounces and up to 24 gallons per minute (based on water). Other sizes proportionately.

Write for Catalog No. 44

mrm company, inc.
191 Berry Street
Brooklyn 11, New York

Manufacturers of a complete line of fully automatic and semi-automatic liquid filling equipment.

the flavor's better when Mojonnier HEATING EQUIPMENT is in the line

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1. Fast heat transfer rates mean that product is in contact with heat for a minimum of time.

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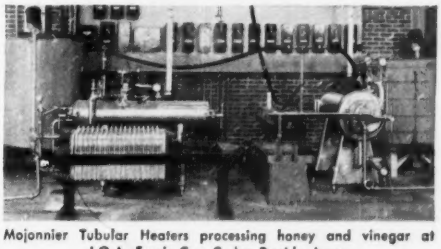

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1—Shriver 42" x 42" Filter Press, 46 chambers.
1—Shriver 36" x 36" Rubber-Covered Filter Press, 36 chambers.
1—Sperry 36" x 36" Filter Press, 42 Heresite covered plates, recessed type, center feed, open delivery.
30—Glass-Lined Jacketed Reactors 30 gals. to 1700 gals. cap., Pfaudler and Glascote.
1—Pfaudler 250 gals. cap. Aluminum Jacketed Reactor. "Unused".
2—Orville Simpson #41 Rotex Filters.
3—Louisville Rotary Steam Tube Dryers 6' x 50'.
1—Buffovak Chrome-Plated Double Drum Dryers, 32" x 90".
10—Baker Perkins & J. H. Day, Double-Arm Jacketed Mixers, Laboratory to 200 gals. cap.

R. GELB & SONS, INC.
UNION, N. J.
Est. 1886 UNionville 2-4900

FOR SALE

Carton Gluer: Packomatic, with Sealer.
Belt Conveyors: 10', 12', 18', 20', 30', 40'.
Powder Mixers: 100 to 2000 lb. capacities.
Tank: 200 gal. stain. steel, agitated.
Tanks: 100-150 gal. Pfaudler jack agit.
Boilers: Gas fired, 3 to 30 hp.
Kettles: Stain. Steel, all sizes, new and used.
Hammer Mills: Prater, Williams, Raymond.
Powder Fillers: Stokes & Smith, Stokes, Triangle, Gump, McMinn, Howes, Day, Weigh Right.
Filter Presses: 7" 12" 24", 36" cast iron.
Fillers: Geyer, Kiefer, Visco, M&S, Elgin.
Filler: Mojonnier No. 60 st. steel.
Labelers: New Jersey, World, Knapp, Burt.
Dough Mixers: 1-6 bbl., single, double arm.
Cappers: Elgin, U. S., Pomona.
Powder Mixers: 30 cu. ft. stain steel.

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Whether it's coffee, or machinery or any other product, hidden costs make up its value. With used equipment you save most of these costs, which have been absorbed by the original purchaser. You pay approximately HALF for a rebuilt machine which has been tested in operation.

Design	15%
Engineering	15%
Research	5%
Application	5%
Construction	20%
Material	40%
Machine..	**100%**

EVERY MACHINE IN YOUR PLANT IS A USED MACHINE

8 ROTEX AND RO-BALL SIFTERS
20" x 48" to 40" x 120"

•

SHRIVER AND SPERRY FILTER PRESSES
12" to 42" Cast Iron, Aluminum
Wood and Other Contacts

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2 LANGSENKAMP STAINLESS STEEL PULPERS—EZ ADJUST MODELS

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DRYERS OF ALL TYPES
Drum Dryers, Apron Type, Steam Tube, Vacuum Drum, Vacuum Chamber Dryer; Roto Louvre Dryers

•

Stainless Steel
REACTORS, PANS, PRESSURE VESSELS
250 Gal. to 1,800 Gal. Jacketed and Unjacketed

FILLING EQUIPMENT

15—Vacuum Fillers, rotary and straight line by Kiefer, Pneumatic Scale, FMC, Horix, etc.
12—FMC, Bertin Chapman, Horix., Haller JUICE FILLERS.
4—FMC and Chisholm-Ryder Stainless HAND PACK FILLERS for No. 2's and 10's.
5—M & S 6 pocket Fillers.
12—PISTON TYPE FILLERS from single to 11 pistons by Filler Machine Co., Elgin, and Ptaudler.
25—DRY POWDER FILLERS by Stokes & Smith, Pneumatic Scale, Triangle, National Packaging and others.

•

LABELING EQUIPMENT

20—World, Ermold, New Jersey semi-automatic LABELERS.
12—Fully automatic Pneumatic SCALE, World, New Jersey and others.
10—CAN LABELERS by Standard Knapp, Burt, Nu-Way, Chishoim-Ryder and others.
6—CAN CASERS state size and pack required.

PLANTS FOR SALE

BREWERY — DISTILLERY — WINERY
VEGETABLE PROCESSING, PACKING
MEAT AND POULTRY — PACKING
VEGETABLE OIL EXTRACTOR
MACARONI — SPAGHETTI
PEANUT BUTTER — SALAD DRESSING
CITRUS FRUIT PACKING

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DOUBLE RIBBON MIXERS
In Stainless and Steel for Powders — Granulars from 200 Lb. to 2,500 Lb. Some with Sifters

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PFAUDLER GLASS LINED VACUUM PANS
500 Gal.—2,500 Gal.—4,200 Gal. Stainless Steel Vacuum Pan

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Brand New Stainless Kettles Now in Stock . . . Jacketed from 50 Gal. to 500 Gal.

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Immediate Shipment on
NEW Stainless Steel Tanks
in All Sizes—Lowest Prices

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Canning Equipment
60 Gallon Stainless Steel Steam Jacketed BUCYRUS kettle. Bottled Gas Burners. Fully equipped with safety valve, gauges, cocks, etc. Insulated.
Brittany Hills, Rock Tavern, New York

FOR SALE
CASE #25A Emulsifier-Homogenizer
300-360 gallon per hour capacity, all stainless steel unit complete with two-inch discharge stainless steel pump, motor and all fittings. This piece of equipment in excellent condition at $2,000 f.o.b. Harlingen, Texas. Communicate with
Harlingen Canning Co., Harlingen, Texas

FOR SALE—IMMEDIATE DELIVERY
4 CHERRY GRADERS
Two revolving cylindrical type, 30" dia. x 18 ft. long, six divisions 14 to 20 M.M. Two vibrating bar, step down type, five divisions, all stainless steel, made by Dunkley. Perfect condition, almost brand new, used last season.
FS-7998, Food Industries
330 W. 42nd St., New York 18, N. Y.

Baker Perkins #17 Oven
Double Radiator, Multicycle Diathermic Heated, Gas Fired with 2 Sets of Trays—
Completely Automatic—Condition like new.
FS-8026, Food Industries
330 W. 42nd St., New York 18, N. Y.

FOR SALE
1—Mojonnier 600 pound Stainless Steel Weigh Can
1—Mojonnier 860 pound Stainless Steel Drop Tank
1—Fairbanks Bridge Type Weigh Can dial scale
Several thousand feet hardening room 1½" and 2" ammonia coils
FS-8076, Food Industries
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Late Model Ptaudler Steam Peeler
Can Labelers—up to #10 Tins and Gals.
Ptaudler Glass Tank, 3000 Gals., Perfect
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Urschel Dicers Model B&L & Diana #7
FMC S.S. 18 spout Juice Filler
Dunning & Boschert 80 ton Fruit Press, Monel, 30" platens, 5 HP motor
Tolhurst 26" S.S. Centrifuge, bottom dump & plow with 10 HP exp. motor
Automatic World Twin Turret Labeler
S.S. Piston Fillers—all sizes and makes
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Complete Vegetable Dehydrating Plant For Sale. Good Buy.

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1 Three Barrel Benj. Franklin Dough mixer, and flour bin, sifter, and elevator $1,000.
1 Three Barrel day dough mixer $500.00 price—F.O.B. Van Buren, Arkansas may be seen at our plant, Van Buren, Arkansas. The machines are in excellent condition and fully guaranteed. Both mixers powered with 15 HP 20 V., 3 phase motors.
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1—6'x50' Rotary Dryer, 1/16" monel lining.
3—6'x40' Stainless Steel Rotary Dryers.
5—Atmospheric Double Drum Dryers 32"x52", 32"x72", 36"x84", 32"x100", 42"x120".
2—Rotary Vac. Dryers 30"x8', 4'x20'.
3—Ross 2-Truck Steam Tray Dryers, 500 sq. ft. 32"x72", 36"x84", 32"x100", 42"x120".
1—Oliver 3'x2' Rotary Vac. Filter.
1—Swenson 4'x5' Rotary Vac. Dryer.
4—Shriver 30", 24", 18", 12" Cast Iron F&F Filters.
4—#12 Sweetland Filters 36 leaves 4" centers.
1—Tolhurst, AT&M 48", 32", 40" Suspended Centrifugals, stainless, model baskets.
1—Tolhurst 26" S.S. Centrifugal, solid basket.
1—Fletcher 32" Suspended Centrifugal.
1—Tolhurst 26" Suspended Centrifugal.
5—Rotex Sifters, 20"x48", 40"x56", 40"x120".
25—S.S. Kettles and Tanks, 20 to 500 gal.
2—Knapp, Burt Automatic Can Labelers, #10 cans.
3—Mikro Pulverizers #18H, 2DH, 4TH.
12—Day, Robinson Powder Mixers 100 to 4000#.
2—Stokes & Smith Model G1 Fillers
3—6'x50', 5'x25' Steam Tube Dryers.
8—Ptaudler 8000 gallon glass-lined Tanks.
20—Stainless Steel Kettles 20 to 500 gal.
3—Mikro Pulverizers #18H, 2DH, 4TH.
21—Ptaudler glass-lined Tanks, 8000 gal.
70—Centrifugal Pumps 1" to 10".
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9.9 H.P. Kewanee Scotch Marine Boilers.
50 gal. S.S. Kettle, jkt., double motion agit.
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500 gal. Pfaudler S.S. Tank, water jkt., with revolving S.S. Coil.
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75 to 1500 gal. Homogenizers or Viscolizers.
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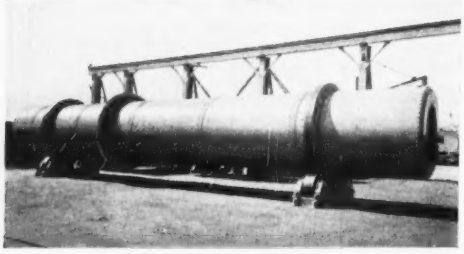

17 years at 24 hours per day—51 years of normal life without mechanical repairs.

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This STANDARD-HERSEY parallel current rotary dryer was built in 1933 for a large chemical company to dry sodium bicarbonate. It has been in operation 97% of the time for 17 years, without shutdown or mechanical repairs (refractory maintenance in furnace included).

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The management estimates the savings made by continuous, trouble free operation to be the equivalent of $85,000 as compared with dryers of other manufacture performing same duty.

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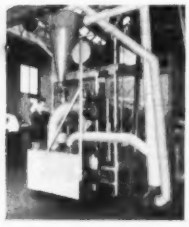

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In order to provide a more complete Readers' Service and to make this service as convenient as possible, the Advertisers' Index and a listing of Editorial Items are combined in the Readers' Service Section in the front of the magazine.

We believe you will approve this change as it serves to prominently list your products and to make it easy for interested readers to request additional information on them.

ADVERTISERS' INDEX

now in the *front* of the magazine, pages 2 and 3

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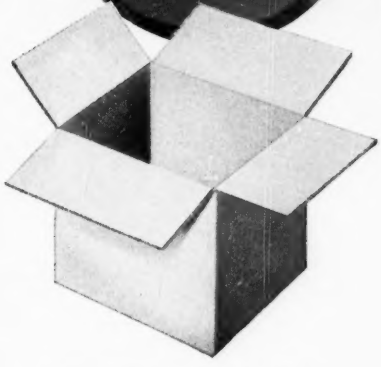

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If your product is properly packaged, claims for damaged merchandise should be almost eliminated. Your customers know this. The annoyance involved in making claims for damage, as well as the sales lost because merchandise is not available, can open the door for your competitors. *Be sure* your shipping container is right for your product.

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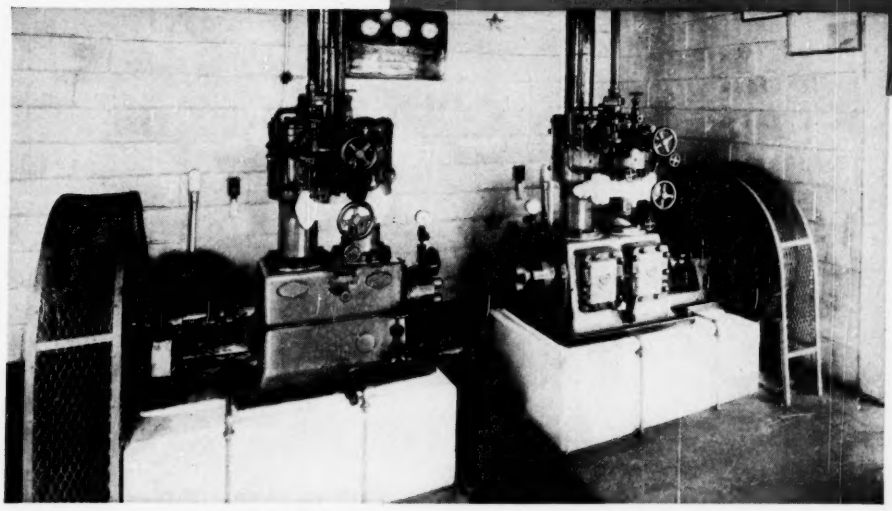

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